

Salmon Research Operational Plans for the Kodiak Area, 2008

by

M. Birch Foster,

Switgard Duesterloh,

Steven Thomsen,

Robert T. Baer,

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and

Steve Schrof

June 2008

Alaska Department of Fish and Game

Division of Commercial Fisheries



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gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
		north	N	base of natural logarithm	<i>e</i>
		south	S	catch per unit effort	CPUE
		west	W	coefficient of variation	CV
		copyright	©	common test statistics	(F, t, χ^2 , etc.)
		corporate suffixes:		confidence interval	CI
		Company	Co.	correlation coefficient	
		Corporation	Corp.	(multiple)	R
		Incorporated	Inc.	correlation coefficient	
		Limited	Ltd.	(simple)	r
		District of Columbia	D.C.	covariance	cov
		et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
		exempli gratia		expected value	<i>E</i>
		(for example)	e.g.	greater than	>
		Federal Information		greater than or equal to	≥
		Code	FIC	harvest per unit effort	HPUE
		id est (that is)	i.e.	less than	<
		latitude or longitude	lat. or long.	less than or equal to	≤
		monetary symbols		logarithm (natural)	ln
		(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
		figures): first three		minute (angular)	'
		letters	Jan,...,Dec	not significant	NS
		registered trademark	®	null hypothesis	H ₀
		trademark	™	percent	%
		United States		probability	P
		(adjective)	U.S.	probability of a type I error	
		United States of		(rejection of the null	
		America (noun)	USA	hypothesis when true)	α
		U.S.C.	United States	probability of a type II error	
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			abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
				standard error	SE
				variance	
				population	Var
				sample	var
Weights and measures (English)					
cubic feet per second	ft ³ /s				
foot	ft				
gallon	gal				
inch	in				
mile	mi				
nautical mile	nmi				
ounce	oz				
pound	lb				
quart	qt				
yard	yd				
Time and temperature					
day	d				
degrees Celsius	°C				
degrees Fahrenheit	°F				
degrees kelvin	K				
hour	h				
minute	min				
second	s				
Physics and chemistry					
all atomic symbols					
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity	pH				
(negative log of)					
parts per million	ppm				
parts per thousand	ppt,				
	‰				
volts	V				
watts	W				

REGIONAL INFORMATION REPORT NO. 4K08-5

**SALMON RESEARCH OPERATIONAL PLANS FOR THE KODIAK
AREA, 2008**

by

M. Birch Foster,
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and
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Kodiak, Alaska 99615

June 2008

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Kodiak Management Area Sockeye Salmon Catch and Escapement Sampling Operational Plan, 2008

by

M. Birch Foster

May 2008

Alaska Department of Fish and Game

Division of Commercial Fisheries



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Time and temperature					
day	d				
degrees Celsius	°C				
degrees Fahrenheit	°F				
degrees kelvin	K				
hour	h				
minute	min				
second	s				
Physics and chemistry					
all atomic symbols					
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity	pH				
(negative log of)					
parts per million	ppm				
parts per thousand	ppt,				
	‰				
volts	V				
watts	W				

KODIAK MANAGEMENT AREA SOCKEYE SALMON CATCH AND ESCAPEMENT SAMPLING OPERATIONAL PLAN, 2008

by

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May 2008

The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: <http://www.sf.adfg.ak.us/statewide/divreports/html/intersearch.cfm>.

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ABSTRACT

In the Kodiak Management Area (KMA), weirs provide the primary mode of enumeration for a majority of the sockeye salmon *Oncorhynchus nerka* escapements into area streams. Annually, the Alaska Department of Fish (ADF&G) and Game samples sockeye salmon escapements from the Karluk, Ayakulik, Upper Station, Frazer, Litnik, and Buskin weirs for biological characteristics (age, sex, and length). In 1985, an expanded commercial salmon harvest (catch) sampling operation was initiated in the KMA that, in combination with the escapement sampling, provide the foundation for preseason run forecasts, escapement goal evaluation, and accurate assignment of the run to stock of origin (run reconstruction). Commercial sockeye salmon catch in the KMA will be sampled for age from individual districts and sections throughout the 2008 season. The overall goal of the project is to provide data to assist with the inseason and long-term management of the KMA sockeye salmon runs.

Key words: Kodiak, weirs, sockeye salmon, *Oncorhynchus nerka*, escapement, sampling, age, length, sex, catch, scales, operational plan.

INTRODUCTION

The Kodiak Management Area (KMA) comprises the western portion of Gulf of Alaska waters surrounding the Kodiak Island Group and adjacent to the Alaska Peninsula from Cape Douglas to Kilokak Rocks (Figure 1).

There are about 800 anadromous salmon streams located throughout the KMA (Johnson and Weiss 2006). These systems combined support five commercially important salmon species: Chinook *Oncorhynchus tshawytscha*, sockeye *O. nerka*, coho *O. kisutch*, pink *O. gorbuscha*, and chum *O. keta* salmon. About 39 of these systems support various sizes of sockeye salmon runs (Dinnocenzo et al. 2007). Alaska Department of Fish and Game (ADF&G) operated weirs provide the primary mode of enumeration for virtually all Chinook salmon and a majority of the sockeye salmon escapements into KMA streams (Figure 2; Caldenty 2007). Remaining streams are monitored by aerial and foot surveys to index pink, chum, and coho salmon escapements (Dinnocenzo et al. 2007).

The KMA is composed of seven commercial salmon fishing districts (Figure 1) and 56 sections. The primary emphasis of the ADF&G salmon management program is to promote maximum production for future KMA salmon returns by supporting salmon escapement of sufficient magnitude and distribution (Wadle et al. 2008). Simultaneously, the goal is to provide for orderly fisheries, maximize harvest opportunities and product quality, and adhere to management plans adopted by the Alaska Board of Fisheries (BOF).

The BOF has approved area salmon management plans for the Cape Igvak Section of the Mainland District, Alitak District, North Shelikof Strait, Westside Kodiak, Eastside Afognak, Crescent Lake, Spiridon Lake, Eastside Kodiak, Mainland District, and North Afognak/Shuyak Island (5AAC 18.360-5AAC 18.369). The intent of these plans is to maintain traditional commercial fishing opportunities and subsequent harvest allocations, stock conservation, and provide for a high quality salmon product.

Five species of salmon are commercially harvested within the KMA, all of which have established escapement goals. The “targeted” escapement goals for KMA salmon are approximately: 8 thousand to 17 thousand Chinook, 750 thousand to 1.7 million sockeye, 2.3 million to 5.8 million pink, 6 thousand to 14 thousand coho (on the Kodiak town road system streams only), and 300 thousand chum salmon (Honnold et al. 2007; Nelson et al. 2005). Directed commercial fisheries occur on sockeye, pink, chum, and coho salmon; Chinook salmon

are not targeted. To open and close the fishery inseason, managers utilize qualitative analyses of run timing, catch per unit effort (CPUE) statistics, species composition estimates, regulatory management plans, aerial survey estimates, test fishery numbers, and weir escapement counts (Dinnocenzo et al. 2007).

Age, sex, and length (ASL) composition data of KMA sockeye salmon escapements have been collected under the direction of various researchers and agencies since the mid 1920s. The ADF&G, Division of Commercial Fisheries, initiated an expanded commercial harvest (catch) and escapement sampling program in 1985 focusing on sockeye salmon. The purpose of this program was to collect representative ASL data from major sockeye salmon systems as well as representative age data from selected commercial sockeye salmon catches. These data continue to expand the KMA salmon baseline ASL database. These samples are used to reconstruct numerous sockeye salmon runs, employing age marker analysis, scale pattern analysis (SPA), and historical harvest proportions to estimate specific stock contributions to commercial fisheries in the KMA (Baer and Honnold 2002; Barrett and Nelson 1994; Barrett and Nelson 1995; Foster 2006; Foster 2007; Nelson 1999; Nelson and Swanton 1996; Nelson and Swanton 1997; Sagalkin 1999; Swanton 1992; Witteveen et al. 2005). Accordingly, these samples provide the foundation for preseason run forecasting and escapement goal evaluation.

GOAL

The goal of this project is to provide ASL composition data from the KMA commercial salmon catch and escapements to assist with the inseason and long-term management of the KMA salmon harvest.

OBJECTIVES

Data derived from sampling of the KMA commercial salmon catch and escapement will be used to achieve the following objectives:

- 1) Estimate the age (scales), sex, and length composition of sockeye salmon escapements into systems in the KMA.
- 2) Estimate the age composition of weekly sockeye salmon catch in major KMA harvest areas.
- 3) Construct accurate brood tables.
- 4) Develop accurate run forecasts.
- 5) Evaluate escapement goals and run timing.
- 6) Address mixed stock fishery issues and annual run reconstruction projects through possible SPA.

TASK

Collect representative samples of scales (for age determination), length, and sex from select sockeye salmon catch and escapements within the KMA.

SUPERVISION

Westward Region finfish research biologist M. Birch Foster will act as overall project leader and supervise inseason progress. KMA management biologists will supervise escapement sampling crews (Table 1). The Kodiak catch sampling project biologist will monitor weekly escapement sampling and review incoming data for quality, quantity, and timeliness. A logbook will be maintained by the project biologist tracking weekly samples, and the weir crew leaders will be given periodic feedback regarding data quality. Unacceptable ASL data forms will be returned to field camps for correction.

PROCEDURES

The standard procedures for collecting and recording salmon ASL data are defined in Appendix A. The accuracy of the data and scale sample quality will be the responsibility of the field camp escapement crew leader or lead catch sampler. Because it is essential that all samples be representative, bias will be avoided by NOT pre-selecting fish based upon size, sex, condition or any other factor. If questions or problems arise, the project biologist should be contacted immediately for clarification or assistance.

All scales, when possible, will be collected from the preferred area of each fish following the methods described by International North Pacific Fish Commission (1963). Scales will be mounted on scale “gum” cards and impressions made on acetate/diacetate cards (Clutter and Whitesel 1956). Fish ages will be assigned by examining scale impressions for annual growth increments using a microfiche reader fitted with a 48X lens following designation criteria established by Mosher (1968).

The most common method of age determination in Pacific salmon is the analysis of the concentric rings (circuli) on the scale. Fast summer growth results in wide spacing between circuli while slow winter growth results in closer spaced circuli; age is determined by enumerating the number of winters observed on the scale (Gilbert 1913). This method of age determination is ideal because the scale can be collected, processed, and aged quite rapidly. Problems encountered using scales for age determination include variable scale growth, scale regeneration, scale reabsorption, and age validation difficulties (Beamish and McFarlane 1983). While no true age validation will be used, a subsample of catch and escapement salmon scales are aged by separate readers for corroboration of age estimates.

Ages will be recorded on sampling forms using European notation (Koo 1962) where a decimal separates the number of winters spent in fresh water (after emergence) from the number of winters spent in salt water. All data will be recorded on standard optical scanning ASL (Opscan) data forms. Opscan forms will be digitally scanned and edited for errors.

Escapement Sampling

For the major sockeye salmon systems (Table 1), weekly sockeye salmon escapement sampling for ASL will be conducted at Karluk, Ayakulik, Upper Station, and Frazer weirs (Figure 2). Samples will be collected using a “Scott” six-panel adult salmon live box trap (Figure 3) incorporated into the weir. Three 80-fish samples will be collected weekly (sample week) on alternating days if possible (i.e., Monday, Wednesday, and Friday), to provide a better representation of weekly escapement (Table 1). The weekly minimum sample size is 240 fish (Thompson 1987). If escapement numbers decline and there is concern that the minimum sample

size will not be achieved, adjustments in sampling efforts should be implemented so that the weekly goal of 240 is met. During 2008, the sampling week starts on Saturday and ends on Friday. Sampling weeks and corresponding calendar dates are listed in Appendix A4.

For the Litnik and Sallery systems, 600 sockeye will be sampled annually (Table 1) with the effort distributed throughout the season and proportional to escapement counts (i.e., peaks in sampling effort will occur during peaks of escapement). The Buskin River and Lake Louise weirs are operated by ADF&G Division of Sport Fisheries personnel and have an alternative escapement sampling plan that is supplemented with a subsistence harvest survey (Tracy and Schmidt *unpublished*).

Catch Sampling

Select sockeye and chum salmon catches will be sampled for age (scales) on a weekly basis by the KMA salmon catch sampling crew and several field crews according to the sampling schedule (Table 2). To ensure that samples are obtained, the crews will begin sampling on the first day of delivery (or harvest) during the designated sampling week (Appendix A4). Each crew leader should review the 2008 Kodiak Commercial Salmon Fishery Harvest Strategy (Wadle et al. 2008) and become familiar with the basic management chronology and terminology.

Local and remote processing facilities (Kodiak, Larsen Bay, and Alitak) within the KMA will be contacted by phone daily to assess the potential arrival of tender and fishing vessels offloading salmon from areas prescribed to be sampled.

All catch samples are to be random, representative and without known bias. Deliveries containing fish harvested from non-targeted areas and deliveries containing loads of mixed origin (< 90% pure by weight) are not to be sampled. There will be no pre-selection of fish for length, sex, condition, or any other factor.

The sample size for each of the major harvest areas (Table 2; Figures 4–8) is a weekly collection of 400 fish (excluding Special Harvest Areas) when commercial harvest allows. The sample size was constructed to permit each age class proportion estimate to be within at least 0.075 of the true proportion with 90% confidence, regardless of number of age classes or population proportions (Bromaghin 1993; Thompson 1987). Sample sizes were set with the assumption that at least 80% of the scale samples will be readable. Typically the percentage of readable scales is greater than 80%. Obtaining scale samples of the highest quality will increase the percentage of readable scales and hence increase the precision of the estimates.

A reduced sampling scheme is required for the Waterfall, Foul, and Kitoi bays Special Harvest Areas (SHA). Those areas have a limited timeframe and salmon harvest magnitude and thus a seasonal sample size of only 600 fish is required (Table 2). The Spiridon Bay SHA (Telrod Cove) will be sampled in the same manner as escapement, with three 80-fish samples collected weekly on alternating days, for a weekly sample size of 240 salmon (Watchers 2006).

DATA REPORTING

KMA weir crew leaders **WILL NOTIFY** Jeff Wadle, Joe Dinnocenzo, or Geoff Spalinger, via Single Side Band (SSB) radio or satellite telephone, of **weekly** sampling results. Field camp personnel will send completed samples back to Kodiak on return grocery or mail flights. Packages should be clearly labeled to include: system, sample dates, and Attn: Foster. The pilot should be instructed to call Fish and Game at 486-1857 for package pick-up.

When catch samplers are sampling at remote locations (e.g., Larsen Bay) they will report primarily to M. B. Foster by phone on a daily basis. The Port of Kodiak catch sampling crew will be responsible for pressing and aging all sockeye salmon scale samples (including escapement), updating the weekly sampling log, and cataloging all catch and escapement sampling data. Only those personnel passing the 2008 Westward Region scale-aging test administered by the project biologist will age the samples.

Data from both the catch and escapement samples in 2008 will be compiled and published by M. B. Foster in the 2008 Kodiak Management Area Catch and Escapement Sampling Results report that will be published in December of 2008.

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TABLES AND FIGURES

Table 1.—Kodiak Management Area sockeye salmon escapement sampling schedule, 2008.

<i>System</i>		Statistical	Sampling	Date		Sample
Sample Location	Supervision	Area	Frequency	Start	End	Size
<i>Major Systems</i>						
Karluk River weir	Spalinger	255-10-101	3 times per week	25-May	30-Sep	240 (weekly total)
Ayakulik River weir	Spalinger	256-15-201	3 times per week	25-May	15-Aug	240 (weekly total)
Upper Station weir	Dinnocenzo	257-30-304	3 times per week	25-May	30-Sep	240 (weekly total)
Frazer Lake weir	Baer	257-40-403	3 times per week	1-Jun	30-Aug	240 (weekly total)
<i>Minor Systems</i>						
∞ Litnik (Afognak) weir	Baer	252-34-342	weekly	25-May	1-Aug	600 (season total)
Saltery Lake weir	Thomsen	259-41-415	weekly	25-Jun	1-Aug	600 (season total)
Buskin River weir ^a	Tracy	259-21-211	weekly	1-Jun	31-Aug	500 (season total)
Lake Louise weir ^a	Tracy	259-21-211	weekly	1-Jun	31-Aug	250 (season total)

^a Buskin River and Lake Louise weirs are operated by ADF&G Division of Sport Fisheries. Escapement sampling is supplemented with subsistence harvest sampling from 1 June to 15 July.

Table 2.—Kodiak Management Area salmon catch sampling schedule, 2008.

District	Geographic Area	Statistical Areas	Primary Sampling Site	Species	Project Supervision	Sample		
						Frequency	Dates	Size
Afognak District								
	Waterfall Bay SHA ^a	251-84	Waterfall Bay	sockeye	Baer	seasonally	6/1 - 7/1	600
	Foul Bay SHA ^a	251-41	Foul Bay	sockeye	Baer	seasonally	6/1 - 6/9	600
	Kitoi Bay SHA ^a	252-32	Kitoi Bay	chum	Aro	seasonally	6/1 - 7/1	600
NW Kodiak District								
	Uganik/Viekoda/Kupreanof	253-11 - 253-35	Kodiak	sockeye	Foster	weekly	6/1 - 9/5	400
	Uyak Bay	254-10 - 254-40	Larsen Bay	sockeye	Foster	weekly	6/1- 9/5	400
	Spiridon Bay SHA/Telrod Cove ^b	254-50	Telrod Cove	sockeye	Watchers	weekly	7/15 - 9/15	240
SW Kodiak District								
	Karluk/Sturgeon	255-10, 255-20, 256-40	Larsen Bay	sockeye	Foster	weekly	6/1 - 9/5	400
	Halibut/Gurney	256-25 - 256-30	Lazy Bay (Alitak)	sockeye	Foster	weekly	6/23 - 8/1	400
	Inner/Outer Ayakulik	256-10 - 256-20	Kodiak	sockeye	Foster	weekly	6/1 - 8/1	400
Alitak Bay District								
	Alitak/Humpy-Deadman	257-10,20 257-50-70	Lazy Bay (Alitak)	sockeye	Foster	when available	6/5 - 8/31	400
	Moser/Olga	257-40 - 257-43	Kodiak	sockeye	Dinnocenzo	weekly	6/5 - 8/31	400

^a Waterfall, Foul, and Kitoi bays special harvest areas (SHA) sample size is 600 fish total; frequency and distribution will depend on harvest magnitude.

^b Spiridon Bay SHA sample size is 240 fish per week (consistent with escapement sampling).

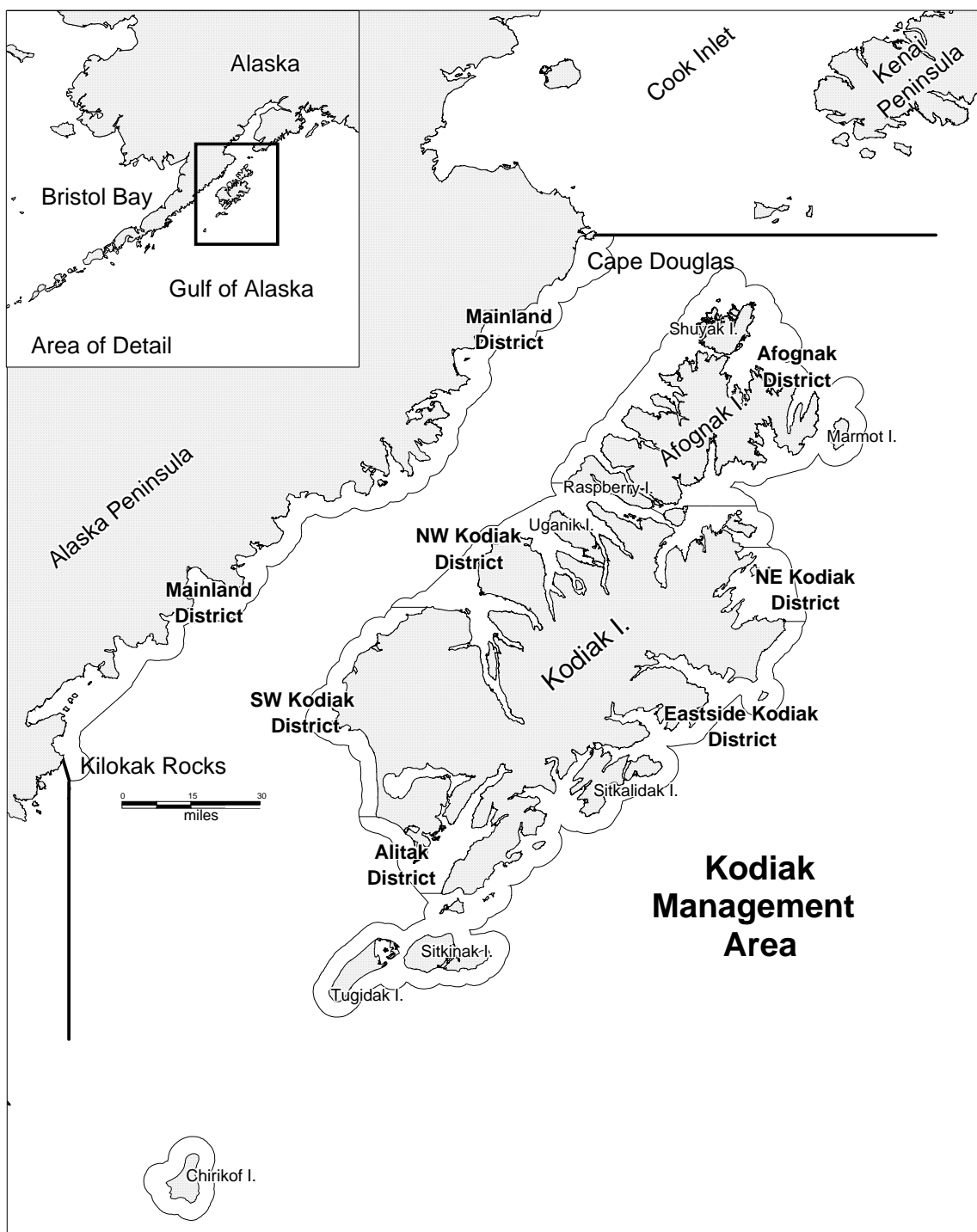


Figure 1.—Map depicting the Kodiak Island Group and the Kodiak Management Area commercial salmon fishery districts, 2008.

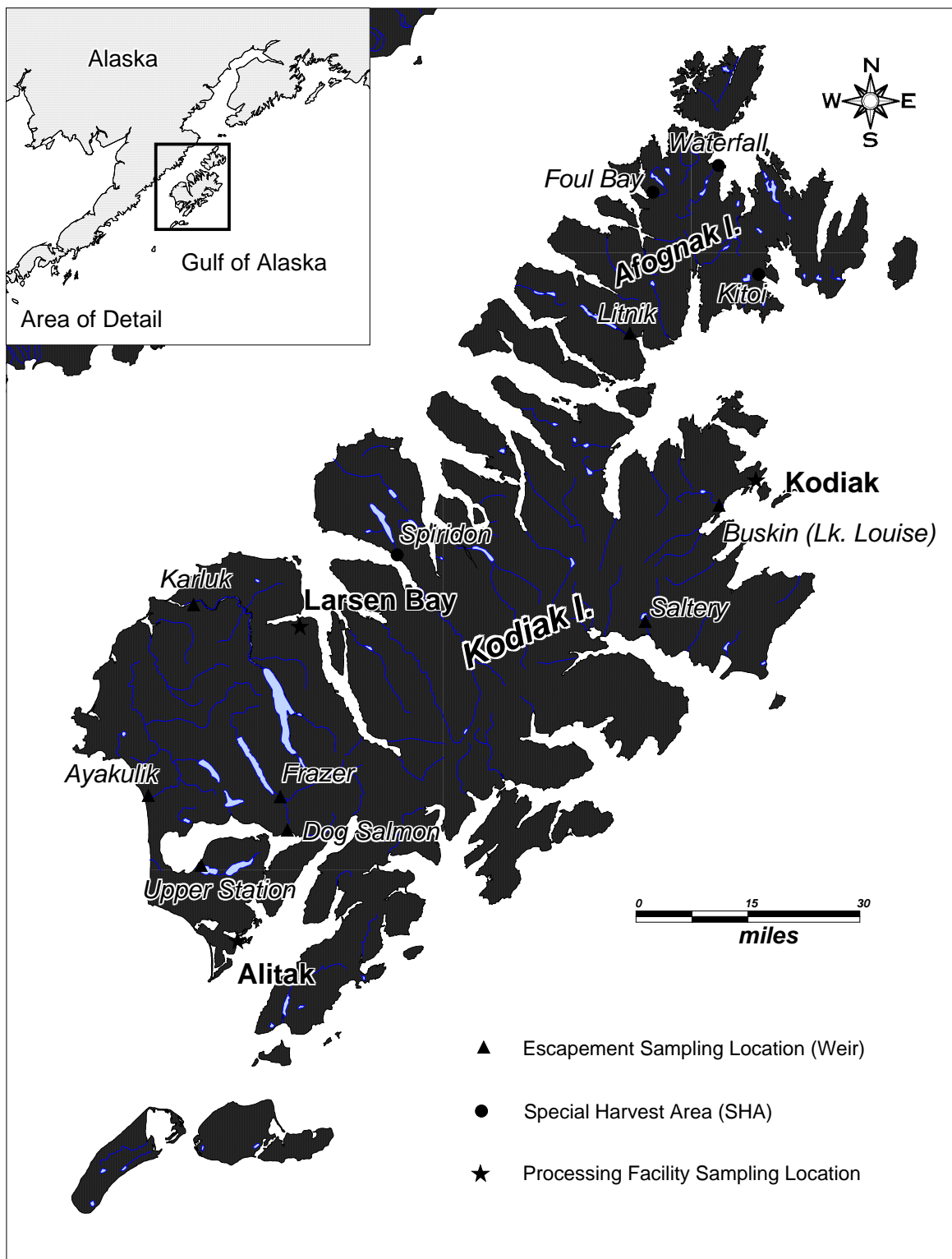


Figure 2.—Salmon escapement, special harvest area, and processing facility sampling locations in the Kodiak Management Area, 2008.



Figure 3.—The “Scott” six-panel adult salmon live box trap (photo taken at Upper Station weir).

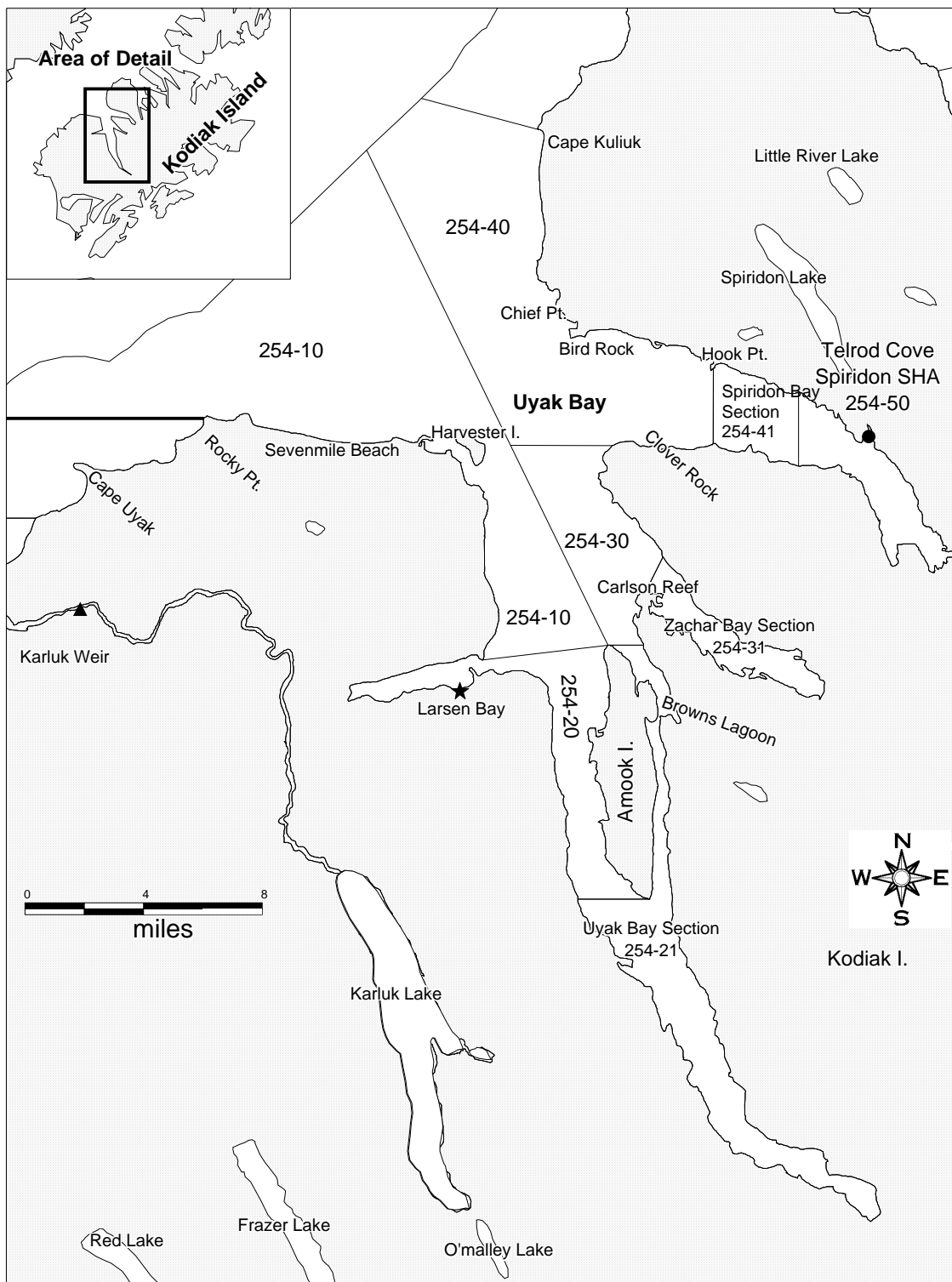


Figure 4.—Kodiak Management Area commercial salmon statistical areas sampled to represent Uyak Bay harvest.

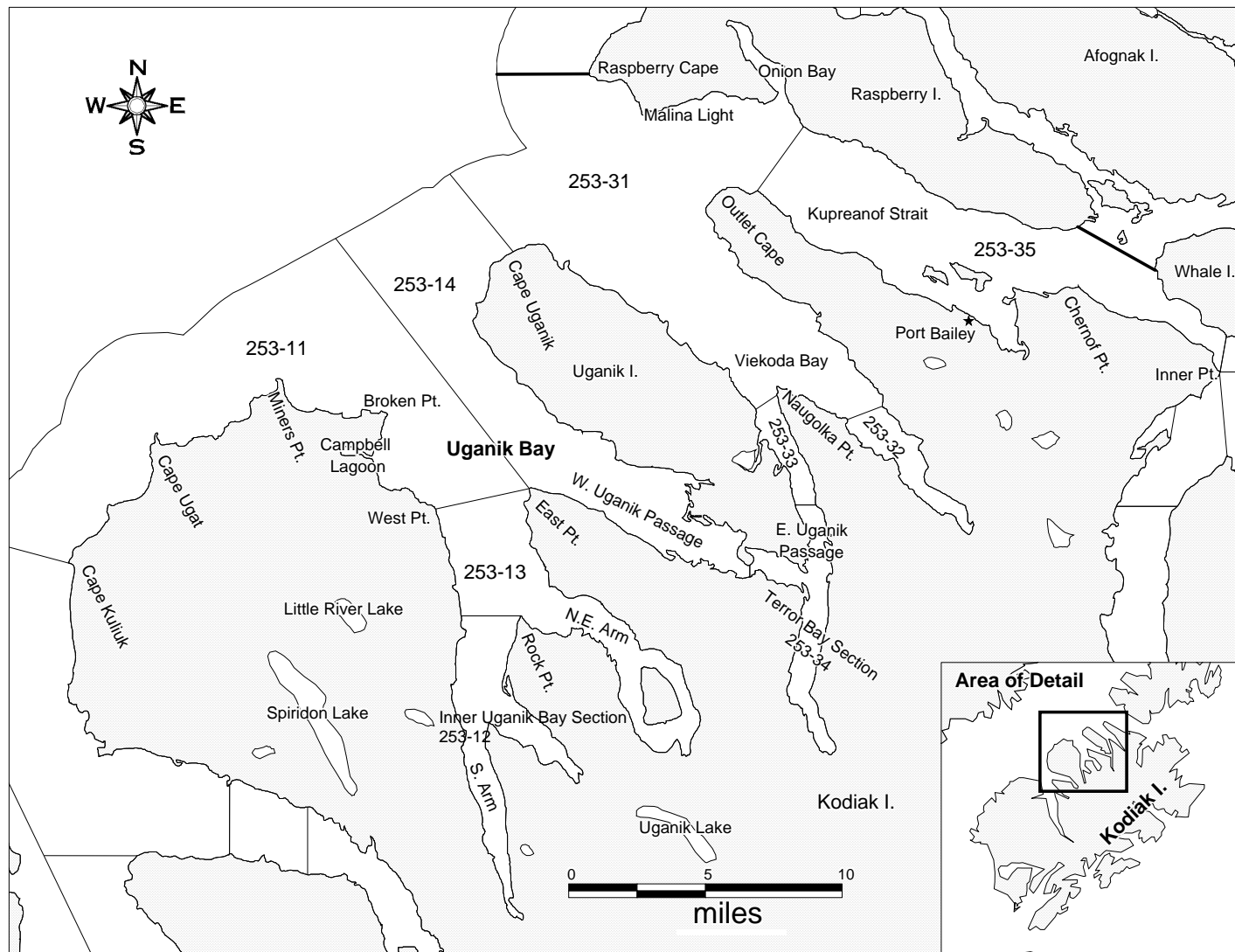


Figure 5.—Kodiak Management Area commercial salmon statistical areas sampled to represent Uganik/Viekoda/Kupreanof harvest.

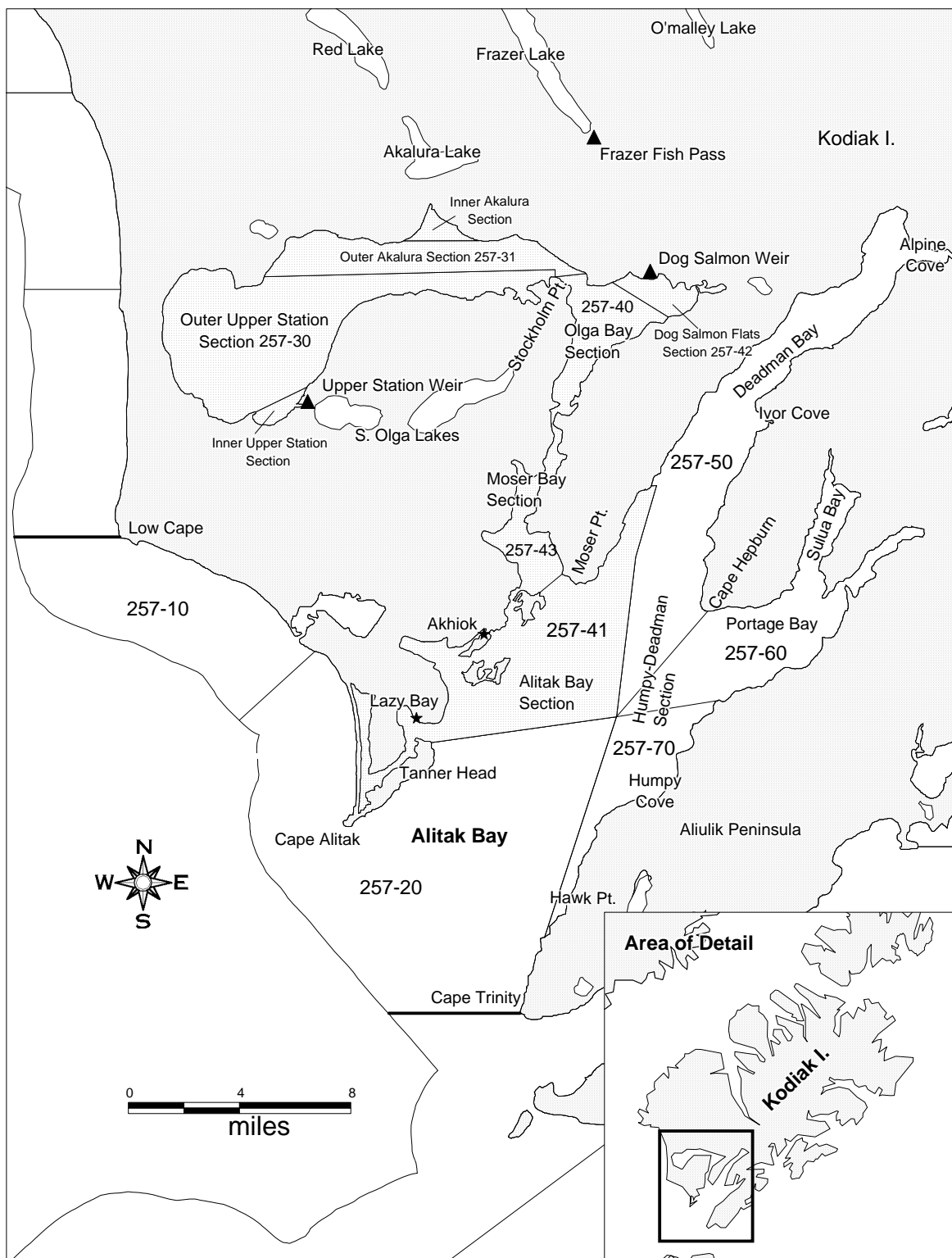


Figure 6.—Kodiak Management Area commercial salmon statistical areas sampled to represent Moser/Olga gillnet (dotted) and Alitak seine area harvest.

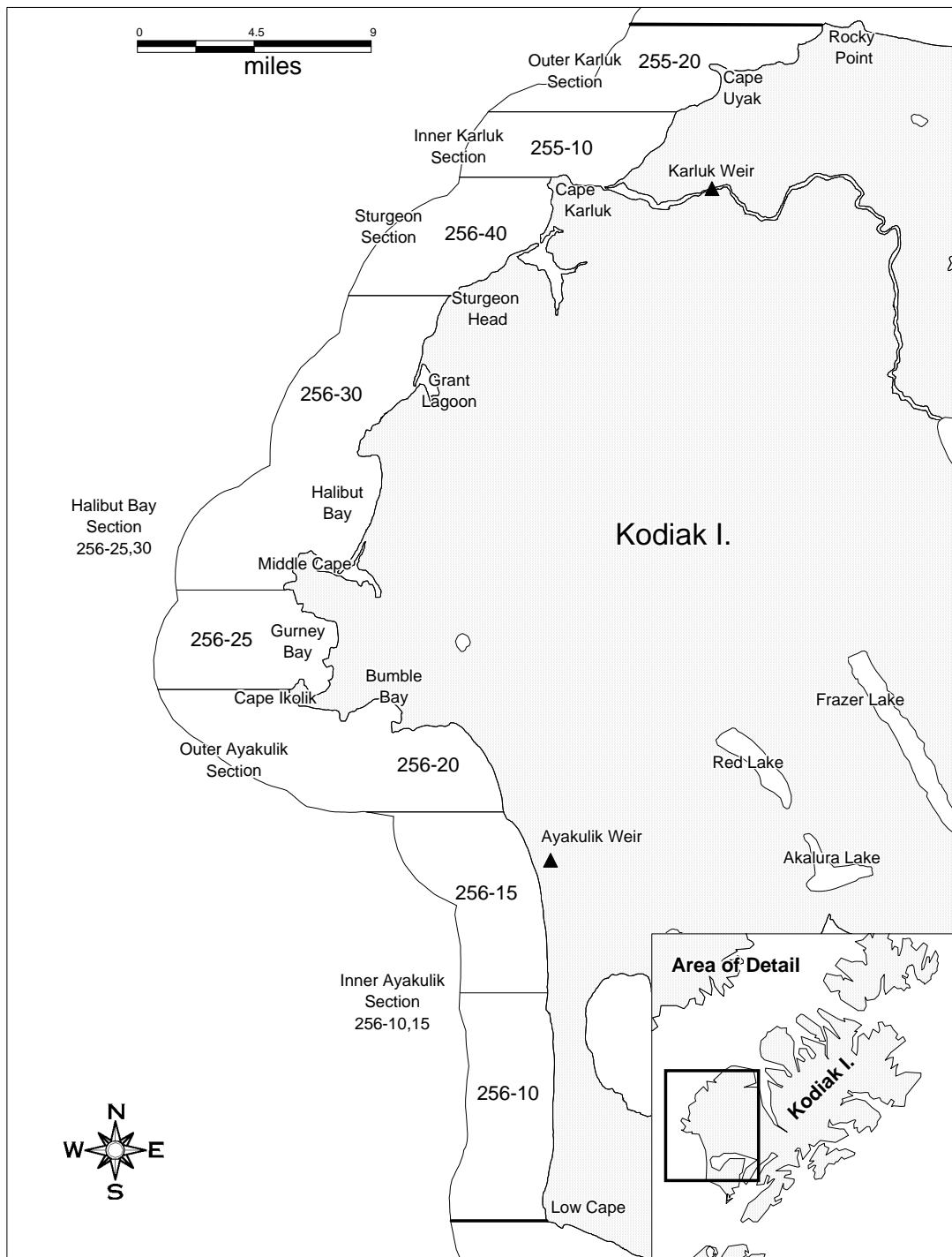


Figure 7.—Kodiak Management Area commercial salmon statistical areas sampled to represent the Southwest Kodiak District (Karluk/Sturgeon, Halibut/Gurney bays, and Ayakulik areas) harvests.

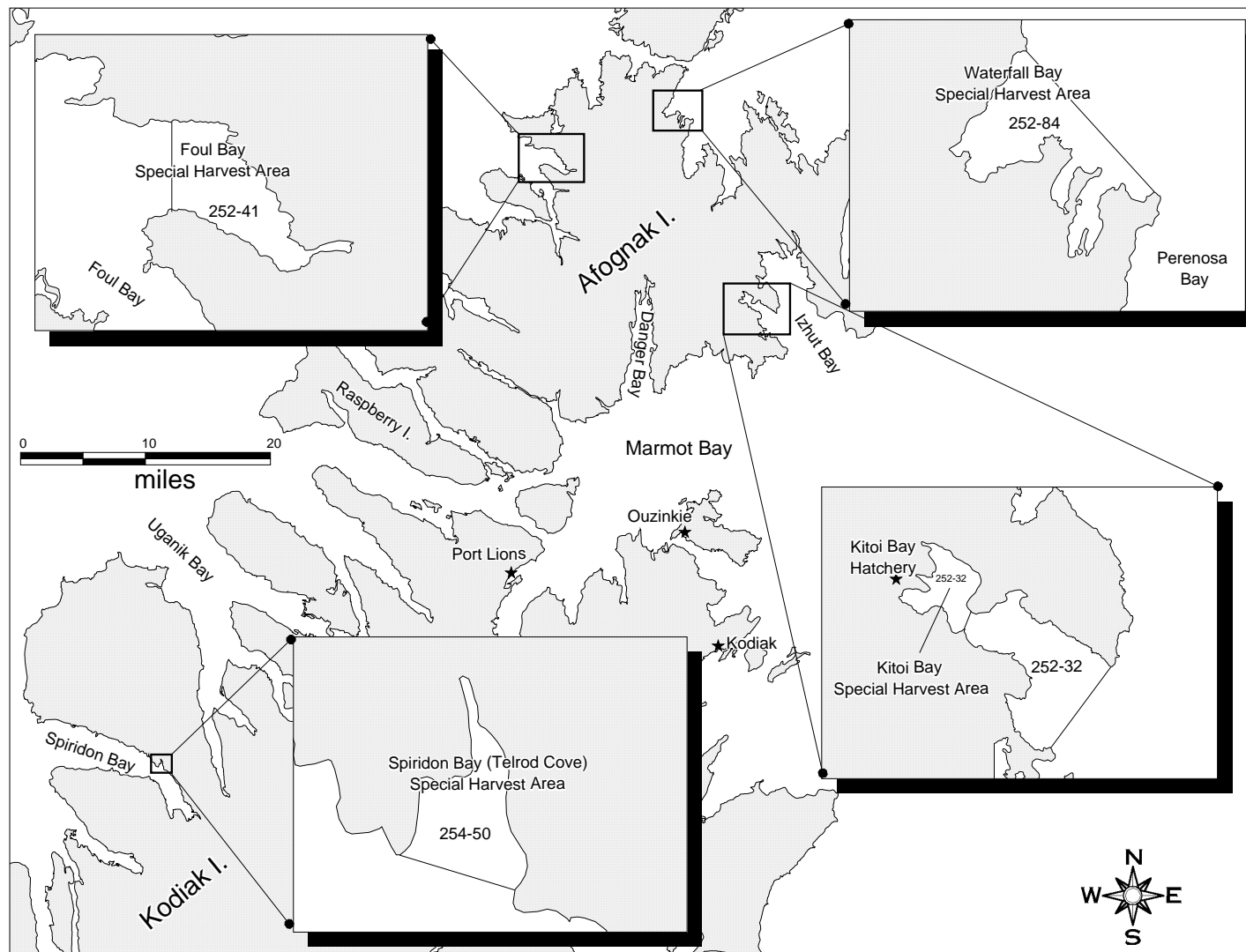


Figure 8.—Kodiak Management Area commercial salmon statistical areas sampled to represent Special Harvest Areas (SHA) at Waterfall, Foul, Kitoi, and Spiridon bays.

APPENDIX A. ADULT SALMON SAMPLING

Appendix A1.—Procedure for sampling adult salmon for age, length, and sex.

Annually, salmon escapements and catches are sampled for age (scales), length, and sex by field crews throughout the State. This database is essential for sound management of the State's salmon resources.

To be useful, data must be recorded on the age, sex, length (ASL) optical scanning (OPSCAN) **green** forms neatly and accurately. In addition, scale samples must be collected and mounted properly to ensure accurate age determination. The following procedures are to be strictly adhered to when sampling adult salmon for age, length, and sex.

PROCEDURES

COMPLETING THE OPSCAN ASL FORMS:

A completed OPSCAN form and accompanying scale gum card for sampling sockeye salmon are shown in Appendix A2.

Complete each section on the left side of the OPSCAN form using a No.2 pencil and darken the corresponding circles as shown in the figures. Make every effort to darken the entire circle as the optical scanner, which reads and records the data from the OPSCAN forms, may not recognize partially filled circles. Label only one form at a time to avoid a "carbon paper effect" resulting in stray marks. Special care should be used to ensure that stray marks do not occur on either side of the OPSCAN form. Stray marks and scuffed OPSCAN forms can severely hamper scanning.

Fill out each of the following:

Description

Record the following: species/area/catch or escapement/gear type (if applicable)/samplers.

Card

The OPSCAN forms and corresponding gum card(s) are numbered sequentially by date throughout the season starting with 001. A separate numbering sequence will be used for each species, district, and geographic location. Consult your crew leader for the current card number. Sockeye salmon scale samples will have only one gum card per OPSCAN form as shown in Appendix A2.

Species

Refer to the reverse side of the OPSCAN form for the correct one-digit code (e.g., sockeye = 2).

Day, Month, Year

Escapement sampling: Use appropriate digits for the date the fish are sampled.

Catch sampling: Use the date the fish were caught. If this differs from the sample date, note the sample date in the top margin.

District

List all districts in which the fish were caught. Consult your area statistical map or project leader for the appropriate district. If more than one district is represented, darken the corresponding circles of the district representing most of the catch and note the other catch areas in the top margin.

Subdistrict (Section)

List all subdistricts in which the fish were caught. If the catch represents more than one section, list each section but do not darken the corresponding circles. Leave blank if the section is unknown.

Stream

Leave blank for catch sampling;

Consult area statistical map for the appropriate stream number when collecting escapement samples.

Location

List the appropriate code associated with the area the fish were sampled as shown in Appendix A4. For example, if the fish were sampled in the Port of Kodiak, the location code would be 031.

Period

Escapement sampling: List the sample week in which the fish were sampled (Appendix A5.).

Catch sampling: List the sample week in which the fish were caught. If this differs from the week the fish were sampled, note this in the top margin.

Project and Gear

Refer to the reverse side of the OPSCAN form for the correct code. For example, escapement samples collected at a weir would have a project code of 3 and a gear code of 19.

Mesh

Leave blank unless specifically instructed by supervisor to do otherwise.

Type of length measurement

Refer to the reverse side of the OPSCAN form for the correct code (e.g., mideye to tail fork = 2). Refer to Appendix A6.

Number of scales per fish

Fill in the number of scales collected per fish. For sockeye, one scale per fish is collected unless otherwise instructed by supervisor.

of cards

of cards always = 1 (each OPSCAN form has an individual and unique “litho code”).

If possible, keep the OPSCAN form litho codes in numerical order throughout the season and keep all forms flat, dry, and clean. Fish gurry and water curling may cause data to be misinterpreted by the optical scanning machine. **It is the responsibility of the crew leader to make sure that all forms are carefully edited before returning them to their supervisor.**

SCALE GUM CARDS

A completed OPSCAN form and accompanying gum card for sampling sockeye salmon are shown in Appendix A2. When collecting two scales per fish, as with coho salmon sampling, follow the procedure illustrated in Appendix A3. Be sure to fill out the gum cards in pencil as shown in Appendix A2 and A3.

Species

Write out completely (e.g., sockeye).

Locality

Escapement sampling: Include the weir site followed by “escapement” (e.g., Karluk River escapement).

Catch sampling: Include the area(s) where the fish were caught followed by “catch” (e.g., Uganik Bay catch).

Statistical Area Code

Fill in the appropriate digits from the OPSCAN form. If catch samples are from a variety of statistical areas be sure to list each statistical area and approximate percentage from each (if available).

Sampling date

Escapement sampling: Fill in the date the fish were sampled.

Catch sampling: Fill in the date the fish were caught. The sample date, if different from the catch date, may be noted in “remarks”.

Gear

Write out completely. If catch samples include multiple gear types, be sure to list each gear and approximate percentage from each (if available).

Collector(s)

Record the last names of each person collecting the sample.

Remarks

Record any pertinent information such as the number of scales per fish sampled, processing facility where the sampling took place, vessel/tender name, etc. Be sure to transfer this information to the top margin of the OPSCAN form.

SAMPLING PROCEDURE

1. Place the fish on its right side to sample the left side.
2. Determine the sex of the fish (escapement sampling only) and darken M or F in the sex columns. If any difficulty is encountered with this procedure, write "I had trouble sexing these fish" on the top margin of the OPSCAN form and ask your supervisor for help as soon as possible before sexing additional fish.
3. Measure fish length in millimeters from mideye to tail fork (escapement sampling only; Appendix A6). Record length by blackening the appropriate column circles on the OPSCAN form. Column 3 on the OPSCAN form is used for fish with a length greater than 999 millimeters (Chinook). Measure all species of salmon to the nearest mm. When collecting length data, take care to ensure that each length corresponds to the appropriate scale mounted on the gum card, as length-at-age is evaluated for each sample.

4. Remove the "preferred scale" from the fish by grasping the scale's exposed posterior edge with forceps and pulling free (Appendix A7). Remove all slime, grit, and skin from the scale (neoprene wristers work well for this). The preferred scale is located on the left side of the fish, two rows above the lateral line on the diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. If the preferred scale is missing, select a scale within the preferred area on the other side of the fish. If no scales are present in the preferred area on either side of the fish, sample a scale as close to the preferred area as possible and darken the 8 under "age error code" on the OPSCAN form. Do not select a scale located on the lateral line.
5. It is important to take care that scales adhere to the gum card, rough side up. Therefore, without turning the forceps over, clean, moisten, and mount the scale on the gum card with your thumb or forefinger. Exert just enough pressure to spread and smooth the scales directly over the number as shown in Appendix A7. The ridges on the sculptured side can be felt with a fingernail or forceps. Mount the scale with the anterior end oriented toward top of gum card. All scales should be correctly oriented on the card in the same direction (Appendix A8.).
6. Repeat steps 1 through 4 for up to 40 fish on each OPSCAN form.
7. When sampling at weirs you may use "Rite in the Rain"® books to record the data. Keep the OPSCAN forms in camp where they will be clean, dry, and flat. After sampling is done for the day, transfer the data to the OPSCAN forms. **Each length, sex, and scale must correspond to a single fish! It is the responsibility of the crew leader to be sure the data has been transcribed correctly and the OPSCAN forms filled out completely.** Log books containing length and sex data should be returned to Matt Foster at the end of the season. These are considered raw data and need to be archived. If you choose to record raw data on tape, these tapes must be returned to Matt Foster.

SAMPLING CHECKLIST

OPERATIONAL PLAN	PENCILS (NO. 2)
GUM CARDS	FORCEPS
OPSCAN FORMS (GREEN)	PLASTIC CARD HOLDERS
NEOPRENE WRISTERS	CLIPBOARD
MEASURING BOARD	LOG BOOK (Rite-in-the Rain)

SOME REMINDERS

1. For greater efficiency in scale reading, mount scales with anterior end toward top of gum card.
2. OPSCAN forms should be carefully edited. Remember to use the new OPSCAN forms (green) as the red and blue forms are outdated. Re-check header information on OPSCAN forms; make sure all available information is filled in. Take extra care to use the correct period code (sampling week) for the sampling or catch date. OPSCAN form numbers should not be repeated; a frequent error is to begin a week's sample with the last OPSCAN number used the week before. This is particularly important if the data is regularly sent to town; it is easy to forget which OPSCAN form numbers were used. Crew leaders should take time to ensure that the circles are being blackened correctly. If the circles are sloppily marked, the optical scanner records the information incorrectly or misses it entirely.
3. Transfer important comments from the gum cards to the OPSCAN forms. After pressing scales, the cards are seldom referred to again, and important remarks can be lost. Write comments in the top right margin. If there is not room on the OPSCAN form to completely explain the remarks, use a separate piece of paper.
4. Never put data from different dates on one OPSCAN form or one gum card. Even if only one scale is collected that day, begin a new OPSCAN form and gum card the next day.
5. If weights are taken, they may be noted in the right margin of the OPSCAN form during sampling, but be sure to transfer the weights and litho code to the appropriate columns on the reverse of the OPSCAN form before submitting it to your supervisor.
6. Try to keep the litho codes (located in the left margin of the OPSCAN form) in numerical order. This should not be hard to do if they are arranged that way before page numbering. When sampling different areas throughout the season, arrange the litho codes in order before each sample is taken.
7. If OPSCAN forms get wrinkled or splotted the data should be transcribed onto a new OPSCAN form prior to sending in. The optical scanning computer will misread or reject torn or wrinkled sheets. Do not use paperclips on OPSCAN forms.
8. Be careful when collecting and mounting scales in wet conditions (rain, high humidity, etc.). If glue dries on top of the scale, it often obscures scale features, resulting in an unreadable scale. In addition, scales frequently adhere poorly to a wet gum card. Protect the cards and keep them dry to avoid having to remount the scales on a new card. If the cards get wet, try to dry them in a protected area or remount if necessary. Remember, use a pencil when filling out gum cards, because ink will come off during pressing.
9. Visually scan all OPSCAN forms for mistakes. A common error occurs, for instance, in placing both the 4 and 7 of a 475mm fish in the 100s column with nothing in the 10s column.
10. Avoid accumulation of incomplete OPSCAN forms. In previous years, there have been cases where individuals have completed several samples before transcribing the information on the OPSCAN forms. This may lead to an increase in errors. After a

sample has been completed, try to get the OPSCAN forms filled out as soon as possible. This will ensure more accurate information, as any problems or abnormalities concerning the sample (e.g., many jacks in sample, many fish lacking preferred scale, number of scales do not match number of lengths recorded, etc.) will be fresh in your mind.

11. Responsibility for accuracy lies first with the primary data collector(s) and finally with the crew leader. Sloppy or incomplete data forms or gum cards will be returned to individual collectors for correction.

Appendix A2.—Completed adult salmon OPSCAN form (front side) and associated gum card.

Species: Sockeye Card No: 014

Locality: Frazer Esc.

Stat. Code: 257-40-403

Sampling Date: Mo. 06 Day 07 Year 2000

Gear: Weir/Trap

Collector(s): D. Roberts, C. Selby

Remarks: _____

DESCRIPTION: Sockeye \ Frazer \ Esc.

CARD: 014

SPECIES: Sockeye

DAY: 07

MONTH: 06

YEAR: 2000

DISTRICT: 257

SUBDISTRICT: 40

STREAM: 403

LOCATION: 038

PERIOD: 24

PROJECT: 3

GEAR: 19

MESH: _____

TYPE OF LENGTH MEASUREMENT: 2

NUMBER SCALES/ FISH: 1

OF CARDS: 1

Samplers: Roberts, Selby

ADF&G ADULT SALMON AGE-LENGTH FORM VERSION 2.1

#	SEX	100's	LENGTH	1's	AGE GROUP	AGE ERROR CODE
1	M	1	2	3	4	5
2	F	1	2	3	4	5
3	F	1	2	3	4	5
4	F	1	2	3	4	5
5	F	1	2	3	4	5
6	M	1	2	3	4	5
7	M	1	2	3	4	5
8	F	1	2	3	4	5
9	F	1	2	3	4	5
10	F	1	2	3	4	5
11	F	1	2	3	4	5
12	M	1	2	3	4	5
13	M	1	2	3	4	5
14	M	1	2	3	4	5
15	F	1	2	3	4	5
16	F	1	2	3	4	5
17	M	1	2	3	4	5
18	M	1	2	3	4	5
19	M	1	2	3	4	5
20	F	1	2	3	4	5
21	F	1	2	3	4	5
22	M	1	2	3	4	5
23	F	1	2	3	4	5
24	F	1	2	3	4	5
25	M	1	2	3	4	5
26	F	1	2	3	4	5
27	M	1	2	3	4	5
28	M	1	2	3	4	5
29	M	1	2	3	4	5
30	F	1	2	3	4	5
31	F	1	2	3	4	5
32	F	1	2	3	4	5
33	F	1	2	3	4	5
34	M	1	2	3	4	5
35	F	1	2	3	4	5
36	F	1	2	3	4	5
37	F	1	2	3	4	5
38	F	1	2	3	4	5
39	F	1	2	3	4	5
40	F	1	2	3	4	5

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DO NOT WRITE IN THIS MARGIN

15429

Appendix A3.—Assigned port and weir location codes.

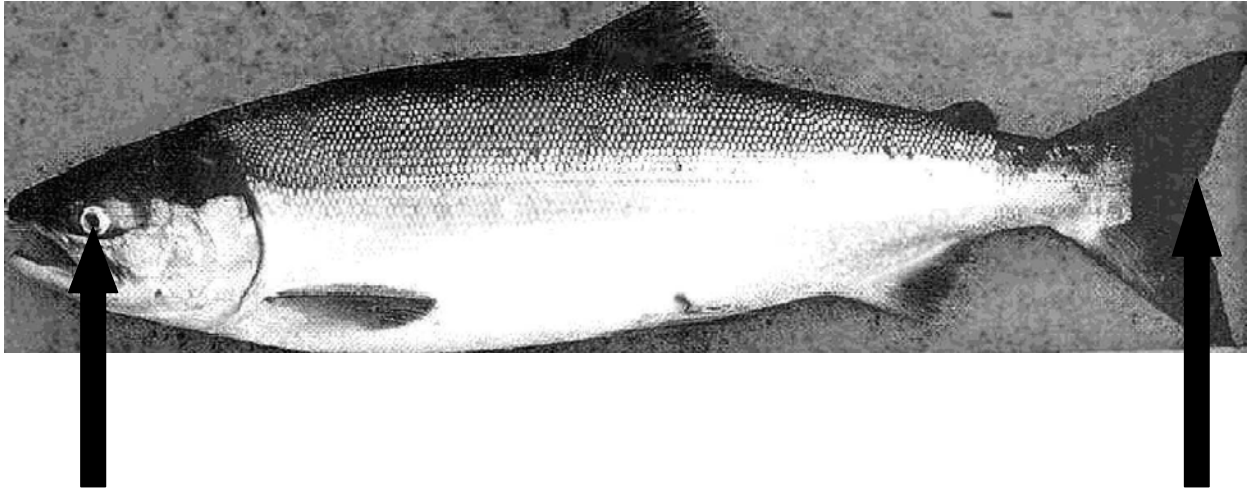
PORT AND LOCATION CODES

028	Saltery	047	Little Kitoi
029	Uganik	048	Waterfall Bay
030	Lazy Bay	049	Little River
031	Port of Kodiak	050	King Cove
032	Pauls Lake	051	Port Moller
033	Thorsheim	052	Dutch Harbor
034	Afognak River	053	Akutan
035	Karluk River	054	Sand Point
036	Ayakulik (Red River)	055	Bear River
037	Upper Station	056	Nelson River
038	Frazer Lake	057	Canoe Bay
039	Dog Salmon	058	Ilnik Lagoon
040	Akalura River	059	Orzinski River
041	Uganik River	060	Sandy River
042	Malina Creek	061	Thin Point Lagoon
043	Portage Lake	062	Middle Lagoon
044	Foul Bay	070	Black Lake
045	Larsen Bay	071	Chignik Weir
046	Spiridon	072	Chignik (Processing facilities)

Appendix A4.–Sampling weeks and associated calendar dates, 2008.

Week	Calendar Dates	Week	Calendar Dates
10	1-Mar - 7-Mar	28	5-Jul - 11-Jul
11	8-Mar - 14-Mar	29	12-Jul - 18-Jul
12	15-Mar - 21-Mar	30	19-Jul - 25-Jul
13	22-Mar - 28-Mar	31	26-Jul - 1-Aug
14	29-Mar - 4-Apr	32	2-Aug - 8-Aug
15	5-Apr - 11-Apr	33	9-Aug - 15-Aug
16	12-Apr - 18-Apr	34	16-Aug - 22-Aug
17	19-Apr - 25-Apr	35	23-Aug - 29-Aug
18	26-Apr - 2-May	36	30-Aug - 5-Sep
19	3-May - 9-May	37	6-Sep - 12-Sep
20	10-May - 16-May	38	13-Sep - 19-Sep
21	17-May - 23-May	39	20-Sep - 26-Sep
22	24-May - 30-May	40	27-Sep - 3-Oct
23	31-May - 6-Jun	41	4-Oct - 10-Oct
24	7-Jun - 13-Jun	42	11-Oct - 17-Oct
25	14-Jun - 20-Jun	43	18-Oct - 24-Oct
26	21-Jun - 27-Jun	44	25-Oct - 31-Oct
27	28-Jun - 4-Jul	45	1-Nov - 7-Nov

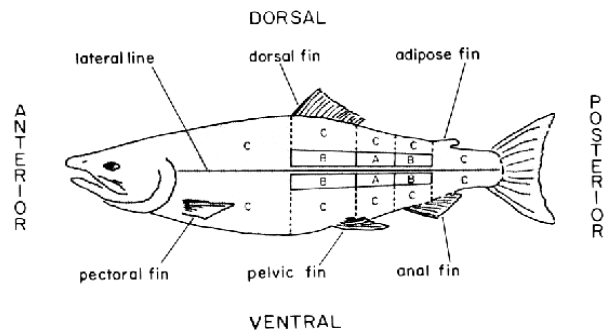
Appendix A5.—Measuring fish length from mideye to tail fork.



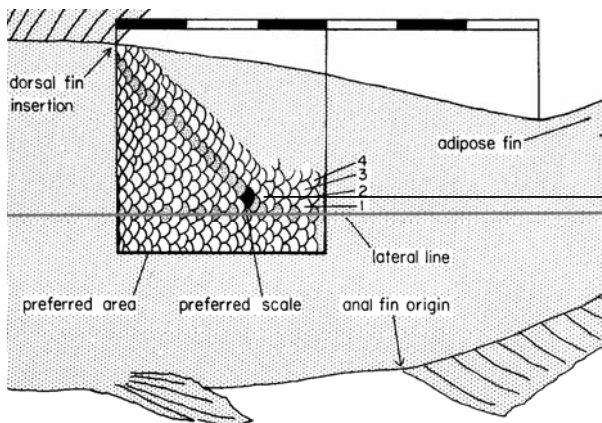
Adult salmon length is measured from mideye to tail fork because the shape of the salmon's snout changes as it approaches sexual maturity. The procedure for measuring by this method is as follows.

- 1) Place the salmon flat on its right side (on the measuring board) with its head to your left and the dorsal fin away from you.
 - 2) Slide the fish in place so that the middle of the eye is in line with the edge of the meter stick and hold the head in place with your left hand.
 - 3) Flatten and spread the tail against the board with your right hand.
 - 4) Read and record the mideye to tail fork length to the nearest millimeter.
-

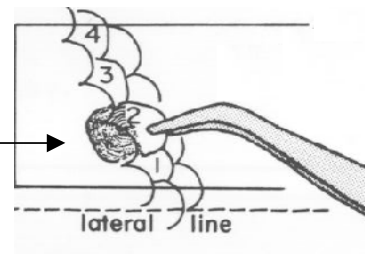
Appendix A6.—Removal and mounting of the preferred salmon scale.



INPFC rated areas for scale removal. Area A is the preferred area. If scales on the left side are missing, try the right side. Area B is the second choice if there are no scales in area A on either side of the fish. Area C designates non preferred areas.



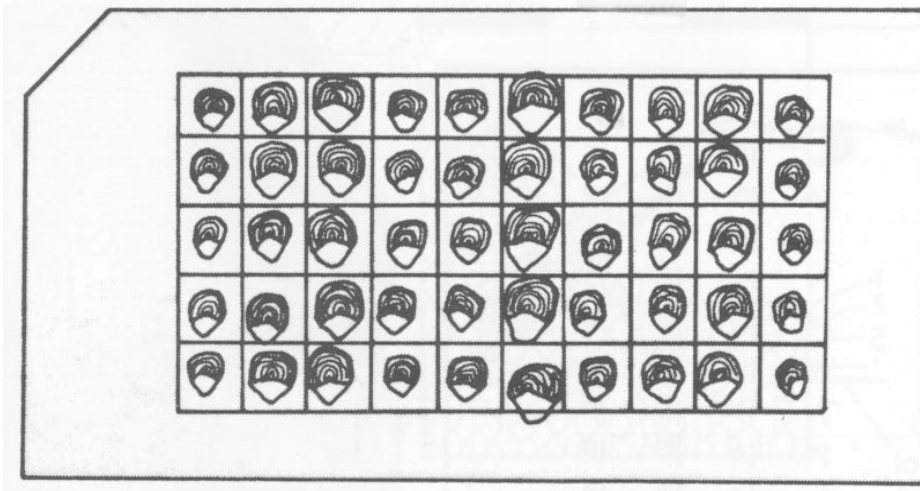
Do not turn scale over.



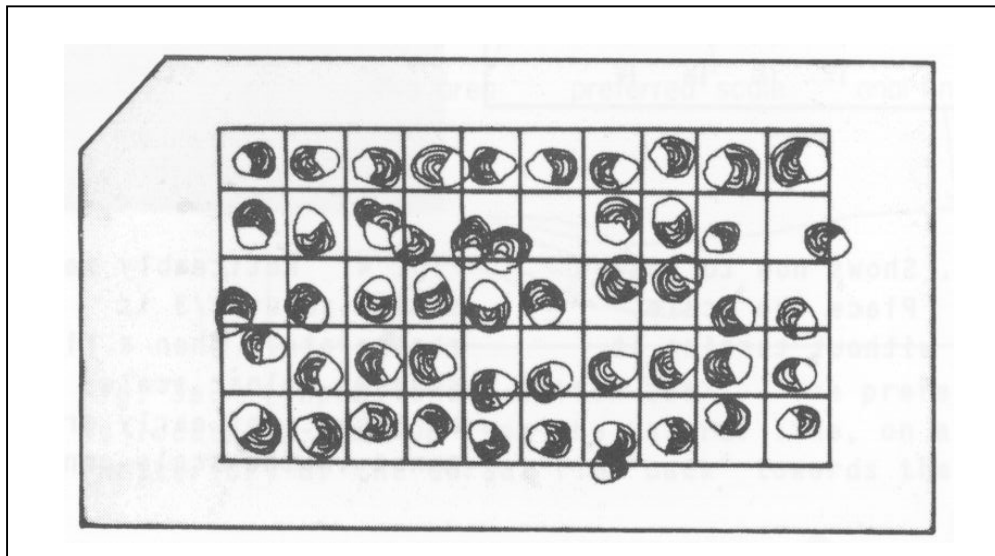
The preferred scale in this diagram is solid black. It is located 2 rows up from the lateral line, on a diagonal from the insertion (posterior) of the dorsal fin “back” toward the origin of the anal fin.



Appendix A7.—Scale orientation on the salmon scale gum card.



The scales are all correctly oriented on the card in the same direction, with the anterior portion of the scale pointed toward the top of the card and the posterior portion (which is that portion of the scale held in the forceps) pointed toward the bottom of the card.



The scales are incorrectly oriented in different directions. This increases the time spent to age samples.

Frazer Lake Operational Plan, 2008

by

Rob Baer

June 2008

Alaska Department of Fish and Game

Division of Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
		north	N	base of natural logarithm	<i>e</i>
		south	S	catch per unit effort	CPUE
		west	W	coefficient of variation	CV
		copyright	©	common test statistics	(F, t, χ^2 , etc.)
		corporate suffixes:		confidence interval	CI
		Company	Co.	correlation coefficient	
		Corporation	Corp.	(multiple)	R
		Incorporated	Inc.	correlation coefficient	
		Limited	Ltd.	(simple)	r
		District of Columbia	D.C.	covariance	cov
		et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
		exempli gratia		expected value	<i>E</i>
		(for example)	e.g.	greater than	>
		Federal Information		greater than or equal to	≥
		Code	FIC	harvest per unit effort	HPUE
		id est (that is)	i.e.	less than	<
		latitude or longitude	lat. or long.	less than or equal to	≤
		monetary symbols		logarithm (natural)	ln
		(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
		figures): first three		minute (angular)	'
		letters	Jan,...,Dec	not significant	NS
		registered trademark	®	null hypothesis	H ₀
		trademark	™	percent	%
		United States		probability	P
		(adjective)	U.S.	probability of a type I error	
		United States of		(rejection of the null	
		America (noun)	USA	hypothesis when true)	α
		U.S.C.	United States	probability of a type II error	
			Code	(acceptance of the null	
		U.S. state	use two-letter	hypothesis when false)	β
			abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
				standard error	SE
				variance	
				population	Var
				sample	var
Weights and measures (English)					
cubic feet per second	ft ³ /s				
foot	ft				
gallon	gal				
inch	in				
mile	mi				
nautical mile	nmi				
ounce	oz				
pound	lb				
quart	qt				
yard	yd				
Time and temperature					
day	d				
degrees Celsius	°C				
degrees Fahrenheit	°F				
degrees kelvin	K				
hour	h				
minute	min				
second	s				
Physics and chemistry					
all atomic symbols					
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity	pH				
(negative log of)					
parts per million	ppm				
parts per thousand	ppt,				
	‰				
volts	V				
watts	W				

FRAZER LAKE OPERATIONAL PLAN, 2008

by

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June 2008

The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: <http://www.sf.adfg.ak.us/statewide/divreports/html/intersearch.cfm>.

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ABSTRACT

The Frazer Lake system, within the Kodiak Management Area, was originally void of anadromous fish species due to a 10-meter barrier falls. From 1951-1971, sockeye salmon *Oncorhynchus nerka* were introduced to Frazer Lake. In 1962, a fish pass was constructed around the barrier fall to allow for fish to migrate up into the lake system. Since construction of the fish pass, the Alaska Department of Fish and Game (ADF&G) has annually operated and maintained the fish pass and its supporting structures to monitor and enumerate the sockeye salmon bound for Frazer Lake. Additionally the field staff collects biological data from the sockeye salmon smolt outmigration. This operation plan is intended to provide the field staff with a reference document for the daily operations of the Frazer Lake fish pass and smolt operations during the 2008 field season.

Key words: Frazer, Dog Salmon, Olga Bay, Sockeye Salmon, *Oncorhynchus nerka*, smolt, fish pass, bypass, fish ladder, weir.

INTRODUCTION

Frazer Lake is located on the southern end of Kodiak Island and is the second largest lake within the Kodiak Archipelago. Frazer Lake is 14.2 km long, and 1.6 km wide, with a surface area of 16.1 km² (Figure 1). Dog Salmon Creek is the outlet to Frazer Lake and drains into Olga Bay. Prior to 1951, Frazer Lake was void of sockeye salmon *Oncorhynchus nerka* because of a 10-meter barrier falls, which prohibited anadromous fish from entering the lake (Russell 1972). Egg, fry, and adult transplants (1951-1971) from sockeye salmon systems on Kodiak Island (Karluk and Red Lakes) and the Alaska Peninsula (Becharof Lake) established a sockeye salmon run to the Frazer system with adults returning for the first time in 1956 (Russell 1972). From 1956-1961, returning adults were backpacked around the falls and, in 1962, a fish pass was constructed to provide access to the lake environment. A second fish pass was installed in 1979, allowing for increased fish passage during peak migration periods.

In 1983, a weir was installed on Dog Salmon Creek, located 0.7 km upstream from lower Olga Bay. The purpose for the Dog Salmon weir was to provide more timely sockeye, chum *O. keta*, and pink salmon *O. gorbuscha* escapement counts to more effectively manage the commercial fishery.

Conservative fishery management practices have been very successful at building the Frazer Lake run from 25,000 sockeye salmon in 1971 to 645,739 fish in 1985. Blackett (1979) established an escapement goal of 383,000 adults based upon limnological and spawning habitat information. Subsequent declines in smolt condition, and shifts in zooplankton size and community composition prompted lowering of the escapement goal to 200,000-275,000 adults in 1986 (Kyle et al. 1988). The goals were lowered again to 140,000-200,000 in 1988 (Nelson and Lloyd 2001). Fertilizer (a mixture of nitrogen and phosphorous) was applied to the lake from 1988-1992 in an attempt to increase survival of lake rearing sockeye salmon fry. This program was instituted in response to dramatic declines in smolt size resulting from high escapements into the lake that occurred during 1980-1982 and 1985. The escapement goal has since been changed to a biological escapement goal (BEG) of 75,000-170,000 (Honnold et al 2007).

The Frazer Lake sockeye salmon stock is now considered of major importance to the island-wide salmon fishery. Also, this introduced run provides for an enhanced food resource for the local Kodiak Island brown bear population, resulting in higher bear densities along Frazer Lake and Dog Salmon Creek.

Sockeye salmon adult enumeration and age, sex, and length (ASL) sampling has been conducted at the Frazer Lake fish pass since 1956. Since 1985, smolt age, weight, and length (AWL) data, smolt emigration timing and zooplankton density and community composition have been measured. This document provides a description of the current research conducted at Frazer Lake and specific methods used for data collection.

PROJECT OBJECTIVES

The ADF&G's goals for the Frazer Lake project are to optimize natural sockeye salmon production and to collect data relevant to generating accurate preseason run forecasts and escapement goal evaluations. Specific objectives are:

1. Determine sockeye salmon smolt condition and age composition.
2. Determine the feasibility of operating a pipeline bypass system for out migrating smolt with the potential of 100% smolt capture and enumeration through the existing fish pass structures.
3. Provide unobstructed and timely adult fish passage to Frazer Lake.
4. Determine escapement timing and magnitude of adult sockeye salmon.
5. Collect age, length, and sex (ALS) data from the adult sockeye salmon escapement, and age, weight, and length (AWL) data from the sockeye salmon smolt emigration.

SUPERVISION AND TRAINING

The project biologist is Rob Baer (Fishery Biologist II), Jason Fox (KRAA Fisheries Specialist IV) is the crew leader and the supporting crew member is a volunteer (Student Conservation Association). The crew leader is responsible for scheduling daily work assignments, ensuring that collected data adhere to plan standards, and ensuring that safety is a priority.

SMOLT MONITORING PROCEDURES

OBJECTIVES

1. Estimate sockeye salmon smolt AWL data and condition factor.
2. Determine the feasibility of utilizing the current water diversion and fish pass infrastructure as a smolt outmigration bypass and enumeration system.

TASKS

1. Operate the inclined plane trap three days a week throughout the sockeye salmon smolt emigration.
2. Sample 40 sockeye salmon smolt every other day for a total of 120 samples per week, for AWL data throughout the emigration.
3. Conduct a pilot study to determine safe and effective methods to divert and enumerate migrating smolt around the Frazer Lake falls.

TRAP CATCH

A single incline plane trap will be installed (Todd 1994) upstream of the 10 m waterfall and just above the concrete water diversion system. The location of the trap will be positioned to catch sockeye salmon smolt for AWL samples as well as assess the viability and effectiveness of the passive smolt diversion system. Daily trap catch data will be documented on the *Sockeye Salmon Smolt Monitoring Form* (Figure 2). The trap will be fished every other day to randomly collect

40 sockeye salmon smolt a day for a total of 120 smolt samples per stat week (Appendix A6). The objective is to collect smolt that represent the outmigration for that day. While the trap is fishing it must be closely monitored to ensure it is operating properly and it is not overcrowding the smolt. Record trap start and stop times. While the trap is not operational, the back of the trap box must be removed and the trap made inoperable to eliminate any undue stress or mortality to migrating smolt.

SPECIES IDENTIFICATION

Proper identification of sockeye salmon smolt is crucial. A helpful source for juvenile salmonids is the 'Field Identification of Coastal Salmonids' by Pollard et. al. (1997). It is the responsibility of the crew leader to ensure species are properly identified.

AGE, WEIGHT, AND LENGTH SAMPLING

From the trap catches, 40 sockeye smolt every other day will be sampled for AWL data. A total of 120 trap caught smolt will be sampled per statistical week. Specific procedures for collecting and recording smolt AWL data are in Appendix A. Each sample should be taken from a single day's catch. Do not mix samples between days. If less than 40 fish are caught in a day, the sample size for that day will be the number of fish caught on that day. **Smolt primarily emigrate at night, so a single sampling day is the 24-hour period from noon to noon and is identified by the calendar date corresponding to the first noon.**

SMOLT DIVERSION AND BYPASS PILOT STUDY

A portion of the 2008 field season will be dedicated to evaluating the feasibility of operating a smolt enumeration system intended to divert all of the out migrating smolt into a pipeline bypass structure that is integrated into the current fish pass infrastructure. The feasibility of an effective smolt bypass system will be determined by examining fish behavior and water dynamics as they relate to Frazer River. All testing and experimentation will be conducted only when constant monitoring can occur so as not to cause any smolt mortality. This pilot study is broken down into three phases;

1. Assess ability to passively divert smolt
2. Channel smolt through concrete raceway and into tank at the top of the fish pass
3. Move smolt into a bypass pipeline
4. Design enumeration system

Success of each phase will be determined by observations of smolt movement through the intended path as well as data collected from the down stream trapping site which will assess relative proportion of smolt escaping around the intended diversion paths. A successful diversion system will divert all migrating smolt and not allow any healthy outmigrating smolt through the diversion device. Consecutive phases of the project will only begin after the prior section is deemed successful. Because this first year is designed to be a feasibility study it will not involve a comprehensive assessment of diversion efficiency. If the entire project is deemed feasible a more comprehensive diversion efficiency test will be tested next year.

Passive smolt diversion

The first phase of this study is intended to passively divert smolt without restricting or altering the majority of the river flow. Throughout the smolt outmigration period an effective means and method of passively diverting out migrating smolt from the middle and left portion of the river

over to the right bank of the river (fish pass side) will be tested. A series of flashers suspended in the water column which are allowed to rotate and reflect strobe lights will be used to passively divert smolt. A taught line will be aligned diagonally across the river in the middle of the water column just upstream of the concrete water diversion system (Figure 3). Flashers and strobes will be attached to the taught line with ganion quick snap-swivels. Spacing between flashers will be adjusted appropriately to eliminate inter-tangling but positioned close enough to effectively divert migrating smolt.

Channel diverted smolt

Once the smolt are passively diverted from the left and middle portion of the river and moved to the right side of the river their downward migration will continue by means of channeling. This will require a balance of water volume and velocity to successfully move smolt into the primary holding/consolidation tank. The passive and active diversion devices should overlap to ensure smolt do not get through the diversion. This portion of the diversion and bypass system will require systematic use of perf plate and weir paneling with appropriate sized perforations to allow for adequate dewatering and yet create sufficient water velocity.

Move smolt into a bypass pipeline

The third section of the study is expected to be the most challenging. An 8" poly pipe will be inserted into one of the outside two fish passes and used as the fish transporting line down to the bottom of the fish pass outlet. For the 2008 season a small section of pipe would be temporarily used to test and run trial experiments for evaluating water movement into the pipe line. This phase of the system will involve significant amounts of dewatering and consolidation of fish in an efficient and safe manner. The highly successful Spiridon Lake bypass system will be used as a model when developing tests and trials (Duesterloh and Watchers 2007).

Design enumeration system

Tests for the enumeration portion of the project are not expected to be obtained in this year of diversion/bypass analysis. The primary goal for 2008 is to establish the feasibility of moving smolt through the diversion system. If the prior phases of this pilot study prove successful a preliminary enumeration plan and design for the system will be developed.

CLIMATE DATA

Collect climate data at approximately the same time period every day. Record the information on the *Climate Observation Form*. These data will include water and air temperatures (°C), stream height (cm), estimated percent cloud cover, and wind direction and velocity (Figure 4). Measure stream height from a stream gauge in a location that is not directly affected by the trap, or the fish pass water diversion system.

TERMINATION OF SMOLT MONITORING

The smolt trap and diversionary system will be removed at the end of the smolt emigration, which is expected to be approximately 30 June. The exact date will be determined by the project biologist based on trap catch performance.

FISH PASS OPERATION AND ADULT SAMPLING

OBJECTIVES

1. Enumerate adult salmon escapement into Frazer Lake.

2. Estimate sockeye salmon average length and sex (ALS) ratios by age class.
3. Monitor escapement quality with respect to numbers of net-marked and “jack” sockeye salmon and identify sockeye salmon with a clipped adipose fin within the ALS sample collection.

TASKS

1. Operate the “old” (near shore) fish pass continuously until a decision to close the fish pass is made by the project biologist.
2. Count the daily escapement by species, and record the number of net-marked and “jack” (less than 400 mm) sockeye salmon.
3. Sample 80 adult sockeye salmon three times per week for ASL data.

FISH PASS PROCEDURES

Operate the shoreward (“old”) fish pass from approximately 15 June through 15 August. Begin operating the fish pass two days after sockeye salmon are first counted through Dog Salmon weir. The far “new fish pass” will be used for smolt bypass experiments and not planned for adult passage. Diversion weirs above and below the Frazer falls should be inspected daily for holes and cleaned when required. Specific instructions for fish pass maintenance and operations are provided in Appendix B. These steps prevent fish from escaping through the lower diversion weir, which has been a major problem in the past. All weir panels on the lower diversion weir should be tightly connected at the base. Panels fit in a channel formed by two pieces of angle iron. This “groove” needs to be cleaned out prior to installing the lower weir. There are “spyglasses” available to check the alignment of panels in the groove. Special attention should be paid to the alignment of the weir panels under water because fish that escape through the lower diversion weir become trapped at the base of the falls.

Salmon escapements through the fish pass will be counted at least four times daily. Increase the counting frequency during the peak of the escapement to minimize migration delays. Record the individual counts by species using hand-held tally counters. Count jack salmon (< 400mm) and severely injured fish separately to assess the escapement quality. Data should be recorded on the *Weekly Escapement Enumeration Form* (Figure 5).

ESCAPEMENT SAMPLING

Adult sockeye salmon sampling will occur at the top of the fish pass throughout the adult escapement. Details and procedures for adult sampling are outlined in the Kodiak Management Area sockeye salmon catch and escapement sampling operational plan, 2008 (Foster 2008).

OTHER REQUIREMENTS

SAFETY

Safety is the highest priority of this project. State of Alaska safety regulations and Standard Operating Procedures (SOPs) must be followed at all times. On-site personnel will exercise extreme caution when considering safety issues. Employees not following state safety regulations may be subject to disciplinary action, including termination.

Employees are expected to review, understand and sign the following SOPs before field deployment. Sections of the SOP that are required reading for field personnel include:

111-700	Safety Policies and Standards;
111-710	Office/Warehouse Safety;
111-720	Field Camp Safety;
111-730	Aircraft Safety for Passengers;
111-740	Boating Safety;
111-750	Vehicle Safety;
111-760	Laboratory Safety;
111-780	Firearm/Bear Safety.

In addition, all employees are required to hold a current American Red Cross First Aid/CPR certification. First Aid/CPR classes will be held in Kodiak prior to the field deployment.

An approved personal flotation device will be worn at all times while boating. A survival kit including matches, VHF radio, flare gun, GPS unit, spare motor parts, and a first aid kit will also be in the boat at all times.

Ultimately, each employee is responsible for his/her own safety.

TRAINING

In addition to mandatory CPR and First Aid training, all field personnel will receive training on salmon sampling protocols and be trained in proper use of firearms.

RADIO SCHEDULE

During the smolt season, Kodiak Research office personnel will contact field camps by Satellite phone on the dispatch service at 1300-1315 (1:00-1:15 PM) hours each day of the week. If contact is necessary at other times, information can be relayed via the Commercial Fishery Management Section schedule at 0800 and 2000 hours. The emergency Coast Guard frequency is 4.125 kHz.

Instructions on the operation and transmission of the satellite phone is provided in Appendix C. The crew leader will train all crew members in proper use of the satellite phone and SSB radio. In order for crewmembers to become more familiar with operating the radio and phone, the crew leader should have the crew member share the radio schedule communications.

AIR CHARTERS

All air charters will be set up through the Kodiak staff. Logistical information will be communicated through daily radio contact. It is important to notify office personnel when any data, equipment, or other freight is "back hauled" to Kodiak and clearly label these items: ADF&G Attn: Rob Baer 486-1835.

REPORTING

Crew leaders will be responsible for recording all of the job activities and compiling biological data. Data forms and a field log will be completed daily. "Rite in the Rain" logbooks will be used while collecting data. Data will be transferred to the proper data forms after returning to the cabin. Use a number 2 pencil when filling in the AWL forms. Data will be reported to Kodiak staff via satellite phone. Completed data forms will be sent to Kodiak as flights permit. Data that

is sent to Kodiak will be properly packaged and labeled. Data forms (not AWL forms) must be able to be duplicated in case originals are misplaced in transit.

A brief report of project activities will be sent to town bi-weekly, or on the next available plane (Appendix D).

PHOTO DOCUMENTATION

Crew leaders will be responsible for photo documenting project activities. Specific aspects such as trap installations, weir construction, and other detailed tasks are important to photograph. When possible, ADF&G digital cameras will be used. However, if State cameras are not available, personal cameras may be used.

TIMESHEETS

Forward timesheets to the KODIAK OFFICE by the 15th and last day of each month! Field crew must plan ahead to ensure that timesheets are received on time. Plan work activities to be completed in a 7.5-hour day; work overtime only if pre-authorized by the project biologist.

PURCHASING

During the field season, field crews will need additional items (e.g., groceries, fuel, or tools). Small lists can be read over the satellite phone; however, these lists should be limited to just a few items. Blank grocery lists will be sent to the field and the crew leader should remember to send orders in advance to ensure the correct grocery order for the next supply flight. It should also be remembered that the budget allocates \$25/day/person and this allocation will not be exceeded. Crew leaders should track grocery expenses and limit the number of requested specialty items. Plan ahead when requesting fuel for heating the camp. When the cabin is unoccupied the heater must be turned off.

VISITORS / PUBLIC INTERACTION

Many people visit Frazer Lake from day-use fishing and bear viewing to extended use through the refuge cabins or campers. Most of these visitors come by the cabin site because the falls attract bears and provide excellent bear viewing opportunities. Visitors are also interested in seeing the fish exiting the fish pass. Due to this frequent contact, the camp must be kept clean and presentable and the field staff will act in a professional and courteous manner that is helpful to visitors. At the same time visitors must be informed of boundaries, limitation and hazards. Be helpful when you can, but remember your primary role is to run the smolt and adult sockeye salmon research project.

CAMP INVENTORY AND CLOSE UP

The Frazer Lake project equipment will be inventoried prior to camp close up. A list of the equipment needed for the next field season should also be provided. The project biologist will provide directions for properly securing the cabin and out buildings prior to the field crew leaving the camp site.

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FIGURES

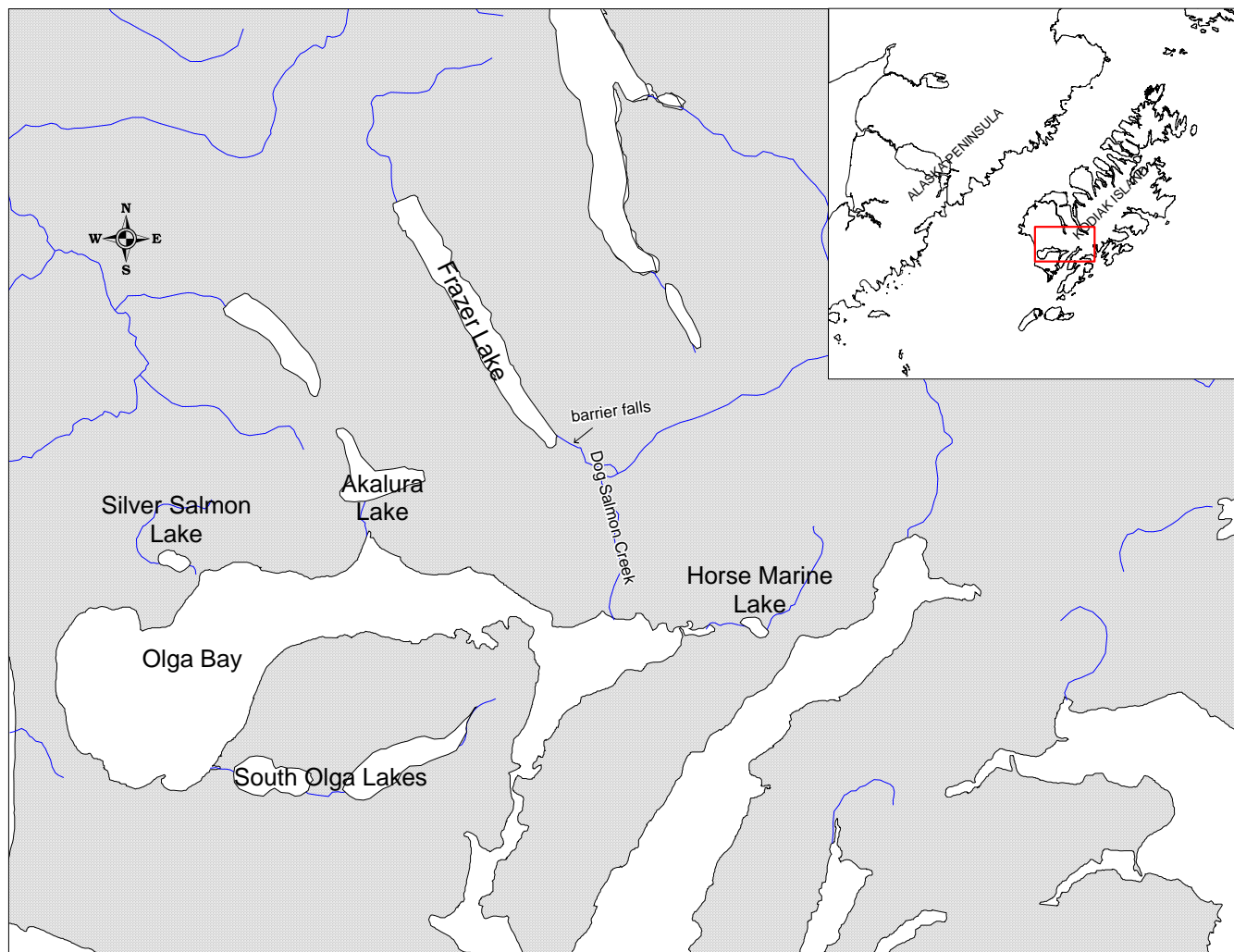


Figure 1.—Location of Frazer Lake on Kodiak Island, Dog Salmon Creek and the Barrier Falls.

SOCKEYE SALMON SMOLT SUMMARY FORM

PROJECT: FRAZER RIVER

YEAR: 2008

page_____of _____

[illegible]

¹ Date fishing occurred (trap or seine).

² Time (military) in which fishing activity occurred, i.e. 2100 - 2200 hr.

³ Total number of fish captured (live and dead) during seine or trap fishing time.

⁴ Total number of dead fish caught during the fishing time.

Figure 2.—Daily smolt catch reporting form.



Figure 3.—Aerial view of Frazer River falls and location of passive diversion taught line.

DAILY PHYSICAL OBSERVATION FORM

PROJECT: _____

YEAR: _____

page _____ of _____

DATE	TIME	TEMPERATURE		CLOUD COVER		VISIBILITY	WIND		STREAM	COMMENTS
		AIR (°C)	WATER (°C)	(%)	Ceiling	(mi)	DIRECTION	VEL. (MPH)	(cm)	

Figure 4.–Daily physical observation form.

**ALASKA DEPARTMENT OF FISH AND GAME
KODIAK MANAGEMENT AREA
WEEKLY SALMON WEIR CAMP REPORT FOR YEAR:**

Location:		Personnel:						Weekly Report no:					For Week Ending Saturday:						
Date	Daily Total Salmon Escapement						Daily Totals	Steelhead		Jack No.	Jack % Sockeye	Net Mark Sockeye	Reds Sampled	Dollys up	H ₂ O Level	H ₂ O Temp.	Weather		
	Sockeye	L. Sockeye	Chinook	Pink	Coho	Chum		Down	Up								Ceiling	Vis.	Wind Dir/Sp
Sun. D																			
C																			
Mon. D																			
C																			
Tue. D																			
C																			
Wed. D																			
C																			
Thur. D																			
C																			
Fri. D																			
C																			
Sat. D																			
C																			
Total for week																			

Additional Comments: Bear and people problems, smolt migration, weir problems, estimated escapements, cabin repair, etc.

Figure 5.—Weekly escapement enumeration form

APPENDIX A. SMOLT AGE-WEIGHT-LENGTH (AWL) SAMPLING MATERIALS AND METHODS

Appendix A1.—Smolt age-weight-length (AWL) sampling materials and methods.

Annually, outmigrating salmon smolt are sampled for age (scales), weight, and length, by field crews throughout the Westward Region. These data are essential for sound management of the State's salmon resources.

To be useful, data must be recorded neatly and accurately on the age, weight, length (AWL) optical scanning (opscan) forms. In addition, scale samples must be collected and mounted properly to ensure accurate age determination. The following procedures are to be strictly adhered to when sampling juvenile salmon for age, weight, and length.

Complete each section on the left side of the AWL form using a No.2 pencil and darken the corresponding circles as shown in the figures. Make every effort to darken the entire circle as the optical scanner, which reads and records the data from the AWL forms, may not recognize partially filled circles. Be sure to transfer the litho code, located in the left margin on the front side of the AWL form to the back side of the form by darkening the appropriate circles (see Appendix A3.).

Label only one form at a time to avoid a "carbon paper effect" resulting in stray marks. Special care should be used to ensure that stray marks do not occur on either side of the AWL form. Stray marks and scuffed AWL forms can severely hamper scanning. The AWL forms should be treated carefully; the scanner in the Kodiak office cannot read damaged forms. The forms should not be stapled, bent, paper-clipped or folded. Specific instructions for completing AWL forms are listed in Appendix A2 and an example of an AWL form filled out for smolt sampled can be found in Appendix A3.

All juvenile salmon AWL data will be recorded in a field notebook dedicated to smolt sampling. These data will then be transferred from the field notebook to the AWL forms. Each species will have its own AWL sample number series that runs sequentially throughout the season. Up to 40 individual fish per smolt day may be included in one AWL sample. If more than 40 fish are sampled in a single smolt day, then multiple AWL numbers will be used on that day. For example, if 70 sockeye salmon smolt are sampled in a single day (day 1), the AWL numbers will be AWL #001 (fish 1-40; 8 slides) and AWL #002 (fish 1-30; 6 slides). The next day will start with AWL #003. Each day's sample will start with a new AWL number. AWL forms will be numbered sequentially.

Smolt will be sampled as soon as possible after they are captured. The smolt will be transported in clean, 5-gallon buckets to the sampling area. An additional bucket of water will be used as a recovery bucket. Buckets containing smolt will be filled with fresh, clean river water and aerated. The buckets will be covered when possible to avoid stress on the fish.

Tricane Methanesulfate (MS-222) will be used to anesthetize the smolt; latex gloves will be worn to prevent direct exposure to the anesthetic. The chemical will be administered by experienced personnel. A small amount (approximately 1 g) of MS-222 and a small amount of baking soda will be dissolved in approximately 2 L of cold water. The amount of anesthetic used will vary depending on the water temperature, freshness of the chemical, and size of the smolt. A few smolt will be placed in the anesthetic solution until subdued to a point where they can no longer flex their axial musculature but can still ventilate their gills. The concentration of the solution should be such that it immobilizes the fish in 2-3 minutes. After the fish are anesthetized, it is important to sample them quickly and place them in a recovery container to prevent mortality. No more than 40 smolt will be anesthetized with one batch of solution.

After the smolt have been immobilized, excess water will be gently removed from the fish using a paper towel or a wet sponge as a blotter. Place the fish on its right side to sample the left side. Measure smolt length, to the nearest mm, from tip-of-snout to tail fork (Appendix A4). Record length by blackening the appropriate column circles on the front side of the AWL form. When collecting length data, take care to ensure that each length corresponds to the appropriate scale smear mounted on the slide, as length-at-age is evaluated for each sample. Weigh each smolt to the nearest 0.1 g, and record the weight by blackening the appropriate column circles on the back side of the AWL form.

On salmon species, the preferred scale is located where a straight line between the posterior insertion of the dorsal fin and the anterior insertion of the anal fin crosses the second scale row dorsal to the lateral line. In smolt, the area directly around this scale is considered the preferred area (Appendix A4). If scales are not present in this area then scales should be taken from the secondary location, which is the same area on the right side of the fish. A scalpel will be used to remove 5-10 scales from the preferred area. These scales will be mounted on a glass slide using a probe to position the scales. Scales from five fish will be mounted on each slide. The scalpel will be wiped clean of scales and slime between each fish. A diagram of a slide with scales mounted correctly is located in Appendix A5.

The left portion of each slide will be labeled with AWL number, sample location, species, date, and inclusive fish numbers. A diagram of a properly labeled slide is located in Appendix A5. After sampling, fish will be held in a recovery container until they are swimming normally and then released downstream of the trapping location. When the slides are completed, return them to the box in order by AWL # and fish #. Label the slide box on top with the information listed in Appendix A5.

Appendix A2.—Procedure for recording salmon smolt age-weight-length data on AWL forms.

Smolt length and weight will be recorded on AWL forms (Appendix A3). Using a No.2 pencil, complete each section of the left side of the AWL and darken the corresponding blocks.

Fill out each of the following:

Description

Record the following: species, location, year and samplers names (e.g., sockeye smolt, Frazer fish pass, 2003, Sagalkin, Schrof).

Card

The AWL forms and corresponding slides are numbered sequentially by date throughout the season starting with 001. A new, consecutively numbered AWL form is used each day even if the previous AWL form is not full. There may be a minimum of one fish and a maximum of 40 fish (8 slides) per AWL form.

Species

Refer to the reverse side of the AWL form for the correct one digit code (e.g., sockeye = 2).

Day, Month, Year

Use appropriate digits for the date the fish are sampled.

District

List the district in which the fish were sampled. Consult your area statistical map or project leader for the appropriate district.

Subdistrict (Section)

List the subdistrict in which the fish were sampled. Consult your area statistical map or project leader for the appropriate subdistrict.

Stream

List the stream in which the fish were sampled. Consult your area statistical map or project leader for the appropriate stream number.

Location

Leave blank

Period

List the period (sample week) in which the fish were sampled (Appendix A6.).

Project and Gear

Refer to the reverse side of the AWL form for the correct code. For example, smolt samples collected in a trap would have a project code of 8 and a gear code of 00.

Mesh

Leave blank unless specifically instructed by supervisor to do otherwise.

Type of length measurement

Refer to the reverse side of the AWL form for the correct code (e.g., tip of snout to tail fork = 2). Refer to Appendix A4.

-continued-

Number of scales per fish

Fill in the number of scales (smears) collected per fish. For smolt, one scale smear per fish is collected.

of cards

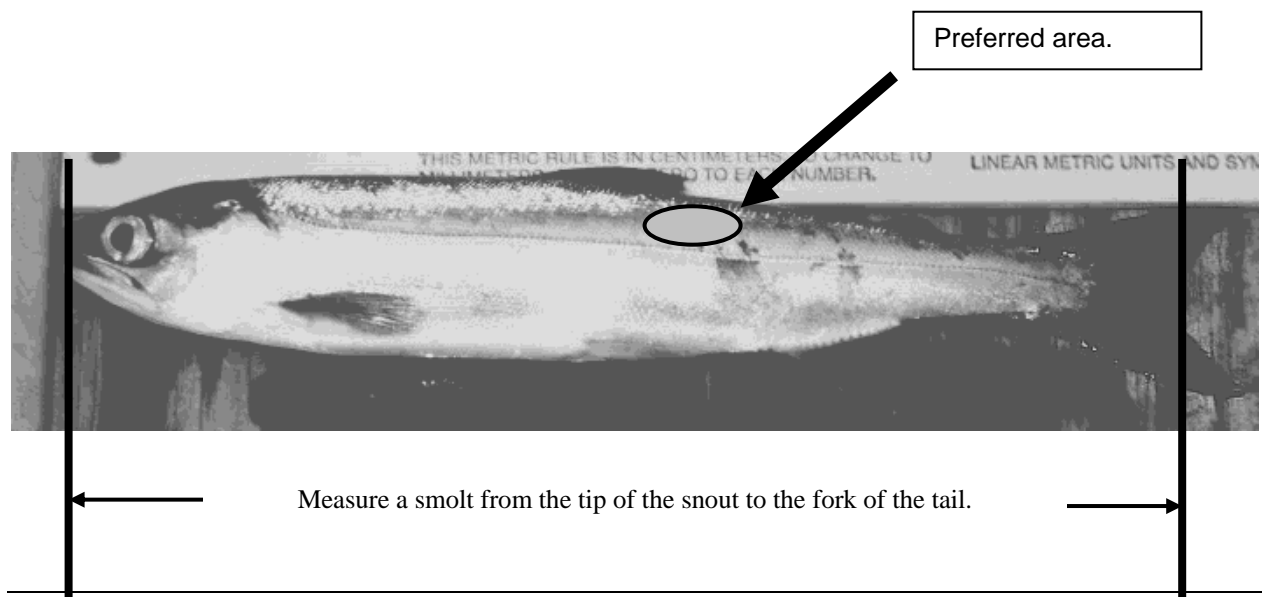
of cards always = 1 (each AWL form is individually numbered).

If possible, keep the AWL forms in numerical order throughout the season and keep all forms flat, dry, and clean. Remember, when sampling smolt, weight data is recorded on the back side of the AWL form and the litho code, located in the left margin on the front side of the AWL form must be transferred to the back side of the form (see Appendix A3). The litho code is the number unique to each AWL form and copying the litho code from the front to the back of the form indicates weight data was transcribed on the back of the form for the Optical scanning machine to read. Fish slime and water curling may cause data to be misinterpreted by the optical scanning machine. **It is the responsibility of the crew leader to make sure that all forms are carefully edited before returning them to their supervisor.**

DO NOT MARK IN THESE AREAS

		SPECIES																			
		1 - Chiton (big) 2 - Snails (big) 3 - Chit (small) 4 - P. (small) 5 - Chit (big)																			
PROJECT 1 - Commercial catch 2 - Subdivided catch 3 - Enclosed (line, with, area, etc.) 4 - Spawning grounds 5 - Trawl fishing 6 - (small) 7 - Spout catch (freshwater)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20						
	7	8	9	10	11	12	13	14	15	16	17	18	19	20							
	8	9	10	11	12	13	14	15	16	17	18	19	20								
	9	10	11	12	13	14	15	16	17	18	19	20									
	10	11	12	13	14	15	16	17	18	19	20										
GEAR TYPE 1 - Trawl 2 - Seine 3 - Dredge 4 - Dredge 5 - Dredge 6 - Dredge 7 - Dredge 8 - Dredge 9 - Dredge 10 - Dredge 11 - Dredge 12 - Dredge 13 - Dredge 14 - Dredge 15 - Dredge 16 - Dredge 17 - Dredge 18 - Dredge 19 - Dredge 20 - Dredge	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20						
	7	8	9	10	11	12	13	14	15	16	17	18	19	20							
	8	9	10	11	12	13	14	15	16	17	18	19	20								
	9	10	11	12	13	14	15	16	17	18	19	20									
	10	11	12	13	14	15	16	17	18	19	20										
LENGTH TYPE 1 - Tip of snail to back of tail 2 - Mid eye to back of tail 3 - Mid eye to front of tail 4 - Mid eye to dorsal plate 5 - Dorsal plate 6 - Dorsal plate	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20					
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20						
	7	8	9	10	11	12	13	14	15	16	17	1									

Appendix A4.—Photo of a smolt with the preferred area highlighted.



Appendix A5.—An example of 2 correctly labeled smolt slides. This represents fish 1 through 10 from a sample collected on 5/11/00.

AWL 001 Sockeye Bear Lake 5/11/00 Fish 1 - 5	1				5
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•

AWL 001 Sockeye Bear Lake 5/11/00 Fish 6-10	6				10
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•

When the slides are completed, return them to the box in order by AWL # and fish #, and label the slide box on top with the following information:

Location: Bear Lake

AWL Number: AWL 001-003

Beginning and end dates: 6/12-7/13/00

Sockeye Salmon Smolt

Appendix A6.—Sampling weeks and associated calendar dates.

Week	Calendar Dates	Week	Calendar Dates
10	1-Mar - 7-Mar	28	5-Jul - 11-Jul
11	8-Mar - 14-Mar	29	12-Jul - 18-Jul
12	15-Mar - 21-Mar	30	19-Jul - 25-Jul
13	22-Mar - 28-Mar	31	26-Jul - 1-Aug
14	29-Mar - 4-Apr	32	2-Aug - 8-Aug
15	5-Apr - 11-Apr	33	9-Aug - 15-Aug
16	12-Apr - 18-Apr	34	16-Aug - 22-Aug
17	19-Apr - 25-Apr	35	23-Aug - 29-Aug
18	26-Apr - 2-May	36	30-Aug - 5-Sep
19	3-May - 9-May	37	6-Sep - 12-Sep
20	10-May - 16-May	38	13-Sep - 19-Sep
21	17-May - 23-May	39	20-Sep - 26-Sep
22	24-May - 30-May	40	27-Sep - 3-Oct
23	31-May - 6-Jun	41	4-Oct - 10-Oct
24	7-Jun - 13-Jun	42	11-Oct - 17-Oct
25	14-Jun - 20-Jun	43	18-Oct - 24-Oct
26	21-Jun - 27-Jun	44	25-Oct - 31-Oct
27	28-Jun - 4-Jul	45	1-Nov - 7-Nov

APPENDIX B. FISH PASS MAINTENANCE AND OPERATION

Initial maintenance of the fish pass should be completed prior to 1 June to ensure proper functioning of the facility.

Maintenance consists of the following:

1. Inspect the fish passes for structural damage.
2. Install the modified I-beam supports on the diversion weir above the falls.
3. Clean the debris from the fish pass tanks.
4. Clean the fish pass entrance if necessary. The shiny surface may make some fish shy away from the entrance, if this occurs, add rocks to cover the aluminum.
5. Clear rocks and streambed materials from the entrance of the exit tank, channel, stop-log base of water control weir, and entrance tanks.

Fish pass opening procedures include:

1. Insert wood drain plugs from the inside of the tanks into drain holes. Plugs should fit tightly, so that internal tank water pressure holds the plug in place. Install the tank caps by screwing them on from the outside.
2. Position tank covers, and remove stop-logs slowly from exit tank. The **bottom stop-log remains in place**. Note that if stop-logs are removed rapidly gravel is deposited into tank.
3. Make sure no holes are present where fish could escape uncounted.

The fish pass should be operated so that the steep pass is about 3/4 full of water. This volume is necessary to attract sockeye salmon to the entrance tank and promote optimum fish passage. A water level of 1.8-1.9 feet should be maintained on the staff gauge by removing or placing stop-logs at the far end of the water control diversion (top of falls). At this level the old fish pass should be 3/4 full. Try to keep stop logs relatively even level across the weir to prevent excessive erosion.

A vertical slot "door" should be placed at the entrance tank during the sockeye salmon run. This door should be checked daily during fish passage to assure it is completely down. It can open, inadvertently, when sockeye salmon hit against it. The opening space (23 cm) is needed to maintain velocity for fish attraction. The door can be opened to 1 foot (30 cm) at seasons end to further attract fish.

The fish pass should be checked daily for cover tightness and unobstructed water flow. Under no circumstances should obstructive materials be placed in the exit tank or steep passes. Make sure to remove any dead fish observed in the exit tank as soon as possible because dead fish will accumulate in the resting tanks making the end of season task of cleaning extremely unpleasant.

Do not let detergents or chemicals enter the fish pass water supply.

Post and maintain a "Keep off the fish pass" sign on the trail between the cabin and the fish pass and put up other signs directing visitor traffic to appropriate trails.

Fish pass closing procedures (approximately 10 August):

1. Remove stop-logs and I-beam supports from the water control weir. Stack logs on the stream bank and store the I-beams (well greased) in the tractor shed. Replace stop-logs in the exit tank, and visqueen as necessary to stop water flow between logs.
 2. Remove all the drain caps by lightly tapping them from outside of the tanks, and store the plugs in the tractor shed. All water should be drained from the tanks. All residual materials within the tanks should be removed.
 3. Remove the vertical slot door and replace it with a solid door to prevent unwanted animals from entering.
 4. Inspect the fish pass and the facility for needed repairs, and list needed materials in the daily log/annual report. **Also include fuel caches and propane so that we know what is left behind.**
 4. When the lower weir is removed, panels should be stored on the lower stream banks. Bolts on the weir should be tightened and replaced if necessary. Catwalk and stringer materials should be inspected and replaced if required. Add lumber needs to the materials list.
-

APPENDIX C. SATELLITE TELEPHONE AND DISPATCH INSTRUCTIONS

Appendix C1.–Satellite telephone and dispatch instructions.

The following information serves as a Policy Statement regarding the allowable uses of ADF&G satellite phones and Instructions on the proper method to successfully set up and operate the satellite phone system assigned to your camp.

These systems are not like standard telephones or cell phones, nor are they like a single side band or VHF radio. Communication is sent through the transmitter to low level satellites, then is beamed down to ground stations, either directly to another satellite phone system or to a switching station linked to standard telephone lines. As such, there is a much higher cost involved in operation than with standard telephone long distance or cell phone charges.

Under NO CIRCUMSTANCES may you use this satellite phone system for personal calls, unless, for each event, you have obtained direct and explicit permission from your supervisor. This does not mean that field crew leaders may grant permission for personal use of this phone. Only the project biologist may give you such permission. ANY DELIBERATE MISUSE OF THIS SYSTEM, SUCH AS MAKING UNAPPROVED, NON-EMERGENCY, OR PERSONAL CALLS, WILL RESULT IN DISCIPLINARY ACTION, WHICH MAY INCLUDE SUSPENSION OR DISCHARGE.

The primary purpose for having this satellite phone is for secure, reliable communications between remote field stations and ADF&G offices (Kodiak, Chignik, Cold Bay, Sand Point, or Port Moller), ADF&G research vessels (Resolution or K-Hi-C), Fish and Wildlife Protection vessels and offices, or other field camps that are similarly equipped. The secondary purpose is for your SAFETY. With these phones you are capable of directly dialing emergency services at any time of the day or night. It is essential that these phone systems are maintained in good working order, are fully charged or hooked to sufficient power at all times, and remain free for official or emergency use.

INSTRUCTIONS

The portable sat phone unit must be charged with power. There is an internal battery pack, and a 12-volt adapter is available in order to hook the phone to a larger battery bank, that may in turn be recharged by generator or solar panels.

Turn the unit on using the power switch in the lower left corner. A green light, just above the switch, should come on indicating that the unit is sufficiently powered. If no light or a red light comes on, you will need to charge the unit, or attach it to your 12-volt battery bank via the appropriate connections.

The back, or top, of the briefcase-like unit is the antenna, and it must be oriented correctly in order to access the receiving satellite. The top of the case should be open and pointed in a general east-southeast direction. You must have a fairly clear line-of sight to the horizon in that direction; this unit will NOT work through walls or mountains. The angle of the antenna should be almost vertical; remember to lock the support arm that attaches the lid to the main body of the unit, along the right side.

This system has two means for calling; a telephone-like handset (for dial in or dial out phone calls), and a push-to-talk microphone (for ‘dispatch’, unit to unit, calls). All calls made with the handset are billed per minute of use, at an expensive rate. All calls on the ‘AlaskaNet’ dispatch system, using the microphone, are essentially FREE.

When first turned on, the handset and microphone should become active, with the display panels on the top of the phone handset and microphone lighting up (one LED panel, hopefully the one on the handset, should read SLEEP). The display will show, after a few moments, whether a connection has been established with the satellite, and how strong the signal is (ex. *B05 S 21*). Turn the unit slightly, and raise or lower the lid/antenna slightly until the highest possible signal strength is indicated (normally above 20 but will work down to 8). Lock the lid/antenna in place and do not turn the unit again, until your communications are finished. Once a strong signal is acquired push the “*” button for 2 seconds. Wait until there is a “beep” and the LCD screen displays ‘00:DN ??’, then dial the number.

Alaska Dispatch System

Because all calls made on the dispatch system are FREE, this is the method of choice for using the satellite phone units. There are several ADF&G offices, many field camps, and two research vessels on the AlaskaNet dispatch system, as well as Fish and Wildlife Protection/State Troopers offices and vessels, plus many canneries, fishing vessels, and tenders. You should have received a 10-12 page directory with your phone.

First, make sure the unit is turned on, and that there is sufficient power. Set the unit up so that the signal strength is at the maximum for your location. You should see the signal strength on the microphone display (ex. *B05 S 21*), and the handset display should read SLEEP. Once a strong signal is acquired push the “*” button for 2 seconds. Wait until there is a “beep”.

On the microphone display, below the signal strength, there should be a query, ‘00:DN ??’. This is asking you to ‘dial’ in the 4-digit dispatch number that you wish to call. After you have entered the 4-digit dispatch number of the unit you wish to contact, hold in the microphone key and a connection will be made with the satellite, which will then try to connect with the dispatch number you punched in. IF a connection is made you will hear two beeps (“bird chirps”) and the microphone display will read SELF. While continuing to hold in the microphone key, call the station you wish to talk to. USE ALL THE SAME FORMALITIES AS WHEN CALLING ON A SSB RADIO. For example, say “Calling the ADF&G Kodiak Office, Calling the ADF&G Kodiak Office; this is Karluk Weir”. When you release the microphone key, the unit will beep again.

BE PATIENT. It will take some time for the signal to go up to the satellite, down to the number you called. It may take the other party some time to get to the microphone and respond (this is especially true for calls to the ADF&G office; supervisors have to walk down to the radio room to respond). When they respond, their 4-digit dispatch number (DN) will show on the microphone display. This is a private conversation, unlike the previous dispatch service.

Just remember to be patient; wait until the other party stops speaking and you hear the unit beep (indicating that they are finished with this portion of their communication), the display should read SELF, and you may key microphone to talk. Then you must again wait for the other party to respond. If the other party is not there, they simply will not answer. If the satellite connection cannot be made, the display will read ‘Unable to Connect’ or ‘Not Available’.

Phone System

DO NOT USE THE HANDSET TO PLACE CALLS UNLESS ABSOLUTELY NECESSARY. All calls made with the handset are billed per minute of use, at an expensive rate. Calls should only be made to supervisors, either when radio or dispatch contact is not possible or when a confidential message needs to be relayed. Calls are made by dialing out, almost like a standard telephone. Punch in the area code and telephone number, then PRESS SEND (button located in the upper right corner of the handset). Because there is a satellite relay, there will be a slight delay between when you speak and when the other party hears you, so be patient.

Note EVERY call in a phone logbook. The system will show you the amount of time you've used on the call, on the LED panel. Note the number called, the date, approximate time, and the length of the call (minutes and seconds). When the call is completed, you MUST push the END button (top right corner of handset buttons), otherwise the system will remain active and YOU will be billed for the time (at almost a dollar a minute). Remember, PRESS END.

If someone calls in to this unit, it will ring, like a standard telephone. Press the SEND button to start the conversation, but remember to PRESS END to finish the call. ADF&G is billed for all calls made using the handset, both the calls you dial out and any calls dialed in.

Assistance

If the phone or dispatch system are not operating properly and you are not able to trouble shoot the issue there is a help line that can be called by dialing **611** on the phone system which will take you to technical support.

IN CASE OF EMERGENCY:

If there is a medical emergency, or a real danger to life or health, IMMEDIATELY call the US Coast Guard Rescue Coordination Center at 800-478-5555. Be ready to tell them your name, exact location (latitude and longitude or nearby major landmark), and the exact nature of your emergency. They may question you extensively, so be prepared. There are emergency doctors on-call that can advise you. After the call is completed, immediately call your supervisor, at work or at home, and relay the details of your experience.

If there is an enforcement emergency, use the dispatch microphone to call the Kodiak office or the Alaska State Trooper, Fish and Wildlife Protection (DN 6370).

APPENDIX D. WEEKLY REPORT EXAMPLE

Appendix D1.—An example of a weekly report.

To: Rob Baer
Alaska Department of Fish and Game
Fishery Research Biologist
Kodiak, Alaska

Date: May 20, 2006

From: Jason Fox
Alaska Department of Fish and Game
Fish and Wildlife Technician III
Litnik Field Camp

Subject: Activity Report for May 14-20, 2006

Smolt Counts & Sampling

The smolt trap here has been fishing since May 10th, but we saw our first smolt on May 16th. Our cumulative catch thru this week is 83. The run seems to have started later this year due to lake freezing and winter-like conditions in the Kodiak/Afognak area until early May. We also sampled 20 smolt on May 19th as an introductory example for new crewmate Josephine Deguzman. The smolt we sampled had an average length of 81.2mm and an average weight of 4.0g.

Dye Test and Trap Efficiency

We have not yet had enough fish to do a dye release test. As far as putting in the smolt trap is concerned, we were not originally able to get the incline into “optimal” position due to high water conditions at the time of installation. As we found out last year, this may be a problem when *low* water conditions occur, as the catch box may not be able to be lowered any further than a potential high spot that it is currently over. This will be addressed as the season goes on.

Adult Weir Counts

The adult sockeye weir was installed and fish tight at 7pm on the evening of May 19th. Surveys of the lagoon and lower river below the weir revealed no signs of returning adults yet. We have not counted any adults upstream as of yet.

Miscellaneous

River otters have been a very significant nuisance so far this season. We have installed a protective cage around the area between the cod end of the incline where fish drop into the catch box. Last year, this seemed effective. However, the chicken wire tends to gather a significant amount of river debris in high water conditions. This debris buildup also tends to cause an increase in smolt mortality because the smolt have to get through the debris to the catch box.

Anticipated Activities

Crew will have to maintain a clean trap to reduce mortality in smolt. We also are going to monitor adult steelhead out-migration this spring to experiment with effective ways to pass them downstream. We also need to fill sand bags to add to weir and smolt trap to make them more secure and fish tight.



ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

MEMORANDUM

TO: Switgard Duesterloh
Fisheries Biologist II
Division of Commercial Fisheries
Region IV - Kodiak

DATE: March 26, 2008

PHONE: (907) 486-1872

FROM: Steven Thomsen
Fisheries Biologist I
Division of Commercial Fisheries
Region IV - Kodiak

SUBJECT: 2008 Operational Plan

Near Island Limnology Laboratory and Kodiak Archipelago Lake Assessment Project Operational Plan, 2008

Introduction

The Lake Assessment Project for the Kodiak and Afognak Islands was started in the mid-1980s as part of a salmon comprehensive plan to examine and prioritize the region's salmon production potential (Schrof et al. 2000). As part of the Kodiak Regional Comprehensive Salmon Plan, limnological and fishery investigations were initiated simultaneously to determine the appropriate enhancement and/or rehabilitation strategy for depressed sockeye salmon stocks *Oncorhynchus nerka* or the stocking potential of barriered lakes without anadromous fish (Honnold et al. 1996).

The current project consists of limnology field sampling and laboratory processing of samples from 14 Kodiak and Afognak Island lakes (Table 1; Figure 1). Samples collected from Big and Little Waterfall, Karluk, Spiridon, Crescent, Frazer, Hidden, Little Kitoi, Ruth, Saltery, Upper Malina, and Upper and Lower Jennifer Lakes as part of the KALAP are processed at the Alaska Department of Fish and Game (ADF&G) Near Island Laboratory (NIL). Water chemistry, nutrient and zooplankton samples, and light attenuation, temperature, and dissolved oxygen measurements from each lake are collected, and data are compiled at the NIL.

In addition, Afognak Lake is monitored as part of the U.S. Fish and Wildlife Service, Office of Subsistence Management, Fisheries Resource Monitoring (FRM) Program (project 04-412; Honnold and Schrof 2004; Table 1; Figure 1). The Afognak Lake project goals, objectives, and

methods are comprehensively covered in the specific project operational plan (Foster et al., 2008).

The NIL has been processing zooplankton samples sent from the ADF&G, Region I, Division of Commercial Fisheries (South East) for the past four years. In 2008, zooplankton samples from seven lakes located in Southeast Alaska will also be processed and the data summarized at the NIL (Table 1). Beginning in 2007, the NIL began processing zooplankton samples sent from the ADF&G Region II, Division of Commercial Fisheries (Cordova). Zooplankton samples from Cordova will be processed at the NIL in 2008 (Table 1). The NIL has been processing nutrient samples sent from the ADF&G Region III, Division of Commercial Fisheries (Nome) for the past two years. Nutrient and zooplankton samples from Nome will be processed at the NIL in 2008 (Table 1).

Goals

1. Provide sampling logistics and laboratory support for limnology in the Kodiak area and assist ADF&G programs in other regions with their sample processing needs if capacity allows.
2. Assess the primary and secondary production of selected sockeye salmon nursery lakes in the Kodiak Archipelago.
3. Monitor rearing conditions of selected salmon systems to assist in lake management of productive juvenile rearing habitat and subsequent adult production.

Objectives

1. Measure water chemistry, nutrient, and chlorophyll *a* concentration from samples collected to estimate the seasonal mean water chemistry, nutrient, and chlorophyll *a* concentrations by unit volume.
2. Quantify and measure each genus or species of macrozooplankton from samples collected to estimate the seasonal mean density, biomass, and size of each of the genus or species.
3. Collect light attenuation data to estimate the compensation depth (EZD) for algal photosynthesis.
4. Determine the temperature and dissolved oxygen regimes.

Tasks

Field sampling

1. Collect lake water at the 1 m depth from Hidden Lake (Schrof and Honnold 2003) at six week intervals.
2. Collect lake water at 1 m depth from Afognak (station one) Lake (Schrof and Honnold 2003) at five week intervals.

3. Collect lake water at 1 and 50 m depths from Spiridon (stations one and two) Lake at five week intervals (Foster et al., 2008).
4. Collect one vertical zooplankton tow at a depth of 50 meters or 1 m off the bottom from Karluk (station two), Upper Malina, Little Kitoi, Hidden, Upper and Lower Jennifer, Ruth, Saltery, Crescent, and Big and Little Waterfall Lakes (Schrof and Honnold 2003) at six week intervals.
5. Collect one vertical zooplankton tow at a depth of 50 meters or 1 m off the bottom from Afognak (stations one and two), Frazer (stations one and three), and Spiridon (stations one and two) Lakes at five week intervals. Frazer camp personnel will sample both stations from May to August.
6. Collect depth profiles of light attenuation (Foot-Candles) from Karluk (station three), Upper Malina, Little Kitoi, Hidden, Upper and Lower Jennifer, Ruth, Saltery, Crescent, and Big and Little Waterfall Lakes at six week intervals.
7. Collect depth profiles of light attenuation (Foot-Candles) from Afognak (stations one and two), Frazer (stations one and three), and Spiridon (stations one and two) Lakes at five week intervals. Frazer camp personnel will sample both stations from May to August.
8. Measure dissolved oxygen (mg/L) and temperatures (°C) from the lake surface to the bottom from Karluk (station three), Upper Malina, Little Kitoi, Hidden, Upper and Lower Jennifer, Ruth, Saltery, Crescent, and Big and Little Waterfall Lakes at six week intervals.
9. Measure dissolved oxygen (mg/L) and temperatures (°C) from the lake surface to 50 meters (or bottom if less than 50 meters) from Afognak (stations one and two), Frazer (stations one and three), and Spiridon (stations one and two) Lakes at five week intervals. Frazer camp personnel will sample both stations from May to August.
10. Measure the water clarity from Karluk (station three), Upper Malina, Little Kitoi, Hidden, Upper and Lower Jennifer, Ruth, Saltery, Crescent, and Big and Little Waterfall Lakes with a secchi disc at six week intervals.
11. Measure the water clarity from Afognak (stations one and two), Frazer (stations one and three), and Spiridon (stations one and two) Lakes with a secchi disc at five week intervals. Frazer camp personnel will sample both stations from May to August.

Laboratory Processing

12. Process and analyze water samples from the Kodiak Archipelago at the NIL for the following nutrients, water chemistry parameters, and algal pigment concentrations: Total Phosphorus (TP), Total Filterable Phosphorous, (TFP), Filterable reactive Phosphorous (FRP), Total Ammonia (TA), Nitrate + Nitrite, pH, Alkalinity, Chlorophyll a, and Phaeophytin a. Total Kjeldahl Nitrogen (TKN) analyses will be subcontracted to the South Dakota University laboratory.

13. Process and analyze water samples from Nome Alaska (Salmon Lake) at the NIL for the following nutrients, water chemistry parameters, and algal pigment concentrations: Total Phosphorus (TP), Total Filterable Phosphorous, (TFP), Filterable reactive Phosphorous (FRP), Total Ammonia (TA), Nitrate + Nitrite, Color, Chlorophyll a, and Phaeophytin a. Total Kjeldahl Nitrogen (TKN) analyses will be subcontracted to the South Dakota University laboratory.
14. Process zooplankton samples from Kodiak Archipelago Lakes for seasonal mean density, biomass, and size of each species of macrozooplankton at the NIL.
15. Process zooplankton samples from southeast Alaska (Chilkoot, Chilkat, Hugh Smith, Hetta, McDonald, Kanalku, and Klawock) Lakes for seasonal mean density, biomass, and size of each species of macrozooplankton at the NIL.
16. Process zooplankton samples from Cordova Alaska (Coghill Lake) for seasonal mean density, biomass, and size of each species of macrozooplankton at the NIL.
17. Process zooplankton samples from Nome Alaska (Salmon Lake) for seasonal mean density, biomass, and size of each species of macrozooplankton at the NIL.

Procedures

Field sampling, laboratory processing, and analyses will follow the procedures outlined in Thomsen (2008) and Koenings et al. (1987). The FRM project will also follow specific operational plan procedures (Foster et al., 2008).

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Afognak Lake Sockeye Salmon Smolt/Adult Project Operational Plan, 2008

by

Rob T. Baer

May 2008

Alaska Department of Fish and Game

Division of Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
		north	N	base of natural logarithm	<i>e</i>
		south	S	catch per unit effort	CPUE
		west	W	coefficient of variation	CV
		copyright	©	common test statistics	(F, t, χ^2 , etc.)
		corporate suffixes:		confidence interval	CI
		Company	Co.	correlation coefficient	
		Corporation	Corp.	(multiple)	R
		Incorporated	Inc.	correlation coefficient	
		Limited	Ltd.	(simple)	r
		District of Columbia	D.C.	covariance	cov
		et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
		exempli gratia		expected value	<i>E</i>
		(for example)	e.g.	greater than	>
		Federal Information		greater than or equal to	≥
		Code	FIC	harvest per unit effort	HPUE
		id est (that is)	i.e.	less than	<
		latitude or longitude	lat. or long.	less than or equal to	≤
		monetary symbols		logarithm (natural)	ln
		(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
		figures): first three		minute (angular)	'
		letters	Jan,...,Dec	not significant	NS
		registered trademark	®	null hypothesis	H ₀
		trademark	™	percent	%
		United States		probability	P
		(adjective)	U.S.	probability of a type I error	
		United States of		(rejection of the null	
		America (noun)	USA	hypothesis when true)	α
		U.S.C.	United States	probability of a type II error	
			Code	(acceptance of the null	
		U.S. state	use two-letter	hypothesis when false)	β
			abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
				standard error	SE
				variance	
				population	Var
				sample	var
Weights and measures (English)					
cubic feet per second	ft ³ /s				
foot	ft				
gallon	gal				
inch	in				
mile	mi				
nautical mile	nmi				
ounce	oz				
pound	lb				
quart	qt				
yard	yd				
Time and temperature					
day	d				
degrees Celsius	°C				
degrees Fahrenheit	°F				
degrees kelvin	K				
hour	h				
minute	min				
second	s				
Physics and chemistry					
all atomic symbols					
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity	pH				
(negative log of)					
parts per million	ppm				
parts per thousand	ppt,				
	‰				
volts	V				
watts	W				

AFOGNAK LAKE SOCKEYE SALMON SMOLT/ADULT PROJECT OPERATIONAL PLAN, 2008

by

Rob T. Baer

Alaska Department of Fish and Game
211 Mission Road
Kodiak, Alaska 99615

May 2008

The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: <http://www.sf.adfg.ak.us/statewide/divreports/html/intersearch.cfm>.

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ADF&G, Sport Fish Division, Research and Technical Services, 333 Raspberry Road, Anchorage AK 99518 (907)267-2375.

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ABSTRACT

Afognak Lake sockeye salmon *Oncorhynchus nerka* runs declined substantially in 2001 and subsequent escapements from 2002-2004 were well below the escapement goal. Responding to concerns from local subsistence users, the Alaska Department of Fish and Game began investigations into the lake's rearing environment. With a successful completion of a one-year mark-recapture feasibility study to estimate smolt abundance in 2003, a three-year study (2004-2006) to evaluate the smolt abundance estimates and assess rearing and spawning habitats was funded. A proposal to continue the smolt enumeration and biological sampling project was awarded funding for an additional three years (2007-2009). The continuation of smolt abundance and condition data are import factors when assessing the adult production. This operation plan provides the instruction and procedures to properly conduct the Afognak Lake smolt outmigration study and operation of the adult escapement weir.

Key words: Kodiak, sockeye salmon, *Oncorhynchus nerka*, smolt, Afognak, Litnik, trap, mark-recapture.

INTRODUCTION

The Afognak Lake drainage is located on the southeast side of Afognak Island approximately 50 kilometers (km) northwest of the city of Kodiak (Figure 1). Afognak Lake (58° 07' N lat., 152° 55' W long.) lies about 21 m above sea level, is 8.8 km long, up to 0.8 km wide, and has a surface area of 5.3 km² (Baer et al. 2007). Runoff from Afognak Lake flows in an easterly direction via the 3.2 km Afognak River, emptying into Afognak Bay. The Afognak Lake system was the most productive sockeye salmon *Oncorhynchus nerka* system on Afognak Island in the 1990s. Total estimated sockeye salmon runs from the Afognak Lake system averaged 130,630 fish from 1990 through 1999 peaking at 219,126 in 1996 (Honnold and Schrof 2004).

Sockeye salmon escapements during the 1990s ranged from 66,869 (1998) to 132,050 (1997) and averaged 90,464 fish, well above the upper range of the Sustainable Escapement Goal (SEG; Honnold and Schrof 2004). In 2000, the sockeye salmon escapement of 54,064 was below the previous 10-year average but still fell within the SEG range of 40,000 to 60,000. Low escapement levels experienced during the 2001 season resulted in commercial salmon fishing closures in the Afognak area until July and season long sockeye salmon sport fishery restrictions. Despite these restrictions, the total sockeye salmon escapement was 24,271 in 2001, far below the lower end of the SEG (40,000; Nelson and Lloyd 2001). Sockeye salmon escapements into the Afognak River failed to reach the low end of the SEG from 2002-2004. During the same three year time period, the commercial salmon fishery in Afognak Bay was closed and sport fishing for sockeye salmon was also restricted. The Alaska Department of Fish and Game (ADF&G) and Federal Subsistence Board jointly closed much of Afognak Bay to subsistence fishing for sockeye salmon in 2002, 2003, and 2004.

In January 2005, the department changed the Afognak Lake SEG of 40,000-60,000 sockeye salmon to a Biological Escapement Goal (BEG) of 20,000-50,000 (Nelson et al. 2005). The escapement goal was changed from an SEG to a BEG based on more thorough spawner-recruit data and was reduced because recent escapement trends are more reflective of sustainable production because the system is no longer stocked with juvenile sockeye salmon or fertilized. After sockeye salmon runs continued to be weak in 2005, a five day commercial fishery opening occurred and 356 fish were harvested. The sockeye salmon commercial fishery was closed in 2006 and 2007. The sport fishery was open through the 2005 and 2006 seasons but closed in 2007. The subsistence fishery was open throughout the 2005 and 2006 seasons with minimal harvests while a closure occurred in 2007 through the month of July.

Prior to 2003, sockeye salmon production had been assessed by adult escapement and harvest estimates; juvenile production (smolt) of the Afognak Lake sockeye salmon stock had not been reliably assessed. In 2003, a sockeye salmon smolt project was initiated at Afognak Lake to estimate the number, age, size, and condition of the smolt emigration. From 2004 through 2007, the smolt project was continued and the rearing environment (limnology) was monitored. An additional three year smolt assessment study will be conducted at Afognak Lake beginning in 2007 and will continue through 2009. These data are essential in determining future Afognak Lake sockeye salmon stock production, as well as the future outlook for subsistence, commercial, and sport harvesters. Additionally, smolt abundance and limnology data will assist in the development of appropriate strategies to improve returns. In addition to smolt and limnology data the operation of an adult weir will enable accurate escapement counts to be obtained as well as adult age, sex and length (ASL) data.

GOAL

The project goal is to assess the sockeye salmon production from Afognak Lake and to develop a strategy to restore and/or stabilize the sockeye salmon run as well as provide (ASL) composition data from the escapement to assist with in-season and long-term management of the Afognak Lake sockeye salmon run.

OBJECTIVES

To achieve the project goal, ADF&G Research personnel will collect data to:

1. Estimate the number of sockeye salmon smolt emigrating from Afognak Lake,
2. Estimate the average age, weight, length, (AWL) and condition of sockeye salmon smolt emigrants from Afognak Lake,
3. Evaluate the water chemistry, nutrients, and zooplankton levels in Afognak Lake, and
4. Enumerate adult salmon escapement through the weir and estimate salmon build-up below the weir in the rivers, lagoons and bays.
5. Estimate the ASL composition of sockeye salmon escapements into Afognak.

TASKS

1. Set up camp. Target completion date: 6-8 May.
2. Install and operate a Canadian fan trap to capture a portion of sockeye salmon smolt emigrants. Target date: 8 May until the end of the smolt emigration.
3. Enumerate the daily smolt trap catch of fish by species.
4. Mark approximately 650 sockeye salmon smolt weekly, using Bismark Brown Y (BBY) dye, to estimate trap efficiency, which is necessary to estimate the total smolt emigration. Of the 650 dyed sockeye salmon smolt, 100 smolt will be held for a delayed mortality experiment.
5. Collect AWL data from 40 sockeye salmon smolt per day, for five consecutive days each week (200 samples/week).
6. Collect physical data daily: air temperature, water temperature, water level, cloud coverage, wind direction and velocity, and precipitation.

7. Collect water and zooplankton samples at station 1 and 2 (zooplankton only) approximately every four weeks from May to September at Afognak Lake (This will be conducted by Steve Thomsen and Tyler Polum as per the Lake Assessment operational plan (Thomsen 2008)).
8. Install, operate, and maintain a counting weir.
9. Enumerate adult salmon escapement through the weir and provide accurate daily reports.
10. Collect representative scales (for age determination), length, and sex from a minimum of 600 randomly selected sockeye salmon escaping to Afognak Lake.

SUPERVISION

Project Biologist: *Rob Baer*- Project Biologist (Fishery Biologist II)

Field Staff: *Thomas Kinsley*- Crew leader (Fish and Wildlife Tech. III)

Cassie Mahl- Crew member (Fish and Wildlife Tech. II)

The project biologist will oversee the project, provide logistical and technical assistance, and write an annual report. The crew leader will implement the ADF&G safety guidelines, schedule daily tasks, and oversee operations at the field camp. The crewmember will assist the crew leader in all assigned tasks and field operations.

PROCEDURES

SMOLT TRAP INSTALLATION, MONITORING, AND MAINTENANCE

A Canadian fan trap will be located approximately 32 m upstream from the stream terminus of Afognak River in Afognak Bay. The trap will be installed so the water velocity is sufficient to force smolt into the catch box while ensuring that smolt are not injured (scale loss, pinned against the perforated sheeting, etc.). Perforated (1/8") aluminum sheeting (4' x 8' perf-plate), supported by a rackmaster supported pipe frame, will be placed at the entrance of the trap in a "V" configuration to increase trap efficiency. If necessary, the perf-plate 'wings' may be lined with plastic sheeting to increase water velocity in the trap and avoid smolt scale loss.

The trap and wings will:

- Be kept free of debris to maintain trap efficiency and minimize smolt mortality.
- Require frequent monitoring and maintenance to ensure that the trap is working properly. The trap should be checked every 3-4 hours during the day and every 1-2 hours at night.
- Be fished continuously for the duration of the smolt emigration (~8 May until ~30 June) and attention to changes in migration patterns will be monitored and recorded (i.e., rain may trigger a large emigration).
- Be modified or the wings pulled from the water to allow smolt to pass safely if unforeseen conditions occur and smolt trapping must temporarily cease. If possible, any modifications to the trapping system will be discussed with the project biologist before implementation. If immediate modifications are necessary to avoid major mortality or loss of equipment, the project biologist will be notified as soon as possible.

SMOLT TRAP CATCH AND SPECIES ENUMERATION

Since smolt primarily migrate at night, a single trapping or sampling day will be the 24-hour period from noon of the first day to noon the following day and will correspond with the first day. All fish caught in the smolt trap will be counted. A dip net will be used to remove and release the fish as they are counted. Smolt needed for sampling will be held in a covered live-box. Smolt will be handled with care, as sockeye salmon smolt are very sensitive to any stress, and mortality can occur through the loss of just a few scales. A tally counter will be used to enumerate the smolt to ensure an accurate count. All data, including smolt mortality will be entered on the *DAILY SMOLT TRAP CATCH REPORTING FORM* (Figure 2) each time the trap is checked. Daily trapping data will be summarized on the *SOCKEYE SALMON SMOLT SUMMARY FORM* (Figure 3).

Pollard et al. (1997) provides color pictures and explanations in the *Field Identification of Coastal Juvenile Salmonids* key for species identification. Contact the project biologist if any questions regarding identification occur.

SMOLT TRAP EFFICIENCY AND MARK-RECAPTURE

The trap efficiency estimates are necessary to estimate the total sockeye salmon smolt emigrating from Afognak Lake. Mark-recapture trials will be conducted to determine what percentage of the outmigration the trap is catching. Bismark Brown Y (BBY) dye will be used to mark and identify the smolt used for these trials. The dyeing process can be very stressful to smolt, so every effort should be made to minimize and avoid unnecessary handling of the smolt during the process. Excessive handling (netting), increased water temperatures, and exposure to the dye are the primary stresses. Individually, these can induce mortality. In combination, significant mortality may occur. The following methods will be used for marking and releasing smolt:

- All data will be recorded on the *Smolt Dye Release Form* (Figure 4).
- Once a week, 650 sockeye salmon smolt will be collected for marking. If the emigrating run strength is not sufficient to capture 650 smolt in one night, smolt will be collected and held in a live-box for up to two days to obtain 650 smolt to be dyed. Approximately, 550 smolt will be dyed and released, while 100 dyed smolt will be retained to monitor delayed mortalities of dyed smolt. Smolt sampled for AWL will not be used in the dye test.
- Dye marking will take place at the release site, located approximately 1,240 m upstream from the trapping site. The smolt will be transported to the mark/release site by four-wheeler and a trailer. A garbage can will be used as a holding/transport container and secured to the trailer. Sufficient water will be added to the can to minimize overcrowding. Water temperatures will be recorded. Supplemental oxygen will be added continuously throughout transport and a lid secured to prevent water from spilling over. Any mortality will be recorded upon arrival at the release site.
- Water temperatures will be taken from both the transport container and the recovery container in the stream. If the temperatures differ by more than 1-2 degrees Celsius, river water will be added to the appropriate container to stabilize the temperature. The smolt will be allowed to rest in a live box in the river for at least 30 minutes after the transport to the marking site. The live box holding the smolt will be covered to minimize stress.

- A solution of 1.9 g of BBY dye to 15 gallons of water will be dissolved in a 30-gallon plastic garbage can. The smolt will be placed in the dye for 30 minutes and the garbage can will be covered and oxygenated continuously (but gently - do not roll them) during the dyeing process.
- Following the dyeing process, all dyed smolt will be held in the live-box for a minimum of 60 minutes. Smolt displaying “abnormal” behavior will NOT be released as part of the test or retained for delayed mortality. A fish with “abnormal” behavior may be swimming on its side, upside down, puffing or flaring gills continuously. All dead and “abnormal” fish that are discovered at this stage of the dye test must be removed from this test population, returned to the river DOWNSTREAM of the smolt trap, and recorded on the Smolt Dye Release Form as a mortality in its perspective cell.
- Dyed smolt displaying “normal” behavior will be counted (up to 550) and released evenly across the creek with the use of water filled buckets. The process should be timed such that smolt will be released at ~2200 hours or under the cover of darkness. The remaining 100 dyed smolt will be held in a live box up to four days to determine smolt survival from the dye as part of the Delayed Mortality Experiment.
- Monitor the smolt trap for marked smolt daily from the day of the release and continue until the next dye test. The number of dyed smolt observed will be recorded on the *Daily Smolt Catch Reporting Form* (Figure 2) and the *Sockeye Salmon Smolt Summary Form* (Figure 3). The daily smolt catch will not include marked smolt, since they were previously counted at the trap site. The trap efficiency from this dye test will be a percentage of the dyed fish recovered divided by the dyed smolt released.

DELAYED MORTALITY EXPERIMENT

To test for potential bias in the mark-recapture estimates of the Afognak Lake sockeye salmon smolt emigration, delayed mortality of dyed smolt will be measured for each dye test. During each dye test, 100 additional smolt will be dyed simultaneously with the 550 smolt dyed that are released to test the trap efficiency. Smolt used for the mortality experiment will be handled the same way as the smolt being released, except they will not be released. Smolt dyed for the mortality experiment will be held in a covered instream live box and checked daily for mortality over a 4-day period. The number of daily mortalities will be recorded by day on the smolt dye release form (Figure 4).

SMOLT AGE, WEIGHT, AND LENGTH SAMPLING

Refer to Appendix A1 for a description of smolt AWL sampling materials and methods. A sample of 40 sockeye salmon smolt per day for five (5) consecutive days per sample week will be collected to obtain AWL data. A sample week begins on Wednesday and runs through the following Tuesday (Appendix A2). All smolt sample data will reflect the sampling day when the fish were captured. Each sample will be comprised of a single day's catch and samples will not be mixed between days. If less than 40 fish are caught in a sampling day, the sample size for that day will be the number of fish caught on that day. Dyed smolt used to estimate trap efficiency will not be sampled.

The daily smolt sample will be taken randomly. Collect smolt hourly and place them in the live box. Use a small dip net to remove a sub-sample of 40 sockeye salmon smolt from the live box

to be sampled. All remaining smolt will be counted and released, unless they are being held for a future dye test.

Smolt will be sampled on the day of capture. Smolt will be measured from the tip of the snout to the tail fork to the nearest mm. (Appendix A3). Excess water will be removed from the smolt before weighing by using a paper towel as a blotter. Individual smolt weights will be measured to the nearest 0.1 g. A scalpel will be used to remove 5-10 scales from the preferred area of the fish (Appendix A3). The scales will be mounted on a glass slide as shown in Appendix A4. Scales from five fish will be mounted on each slide. The left portion of each slide will be labeled with AWL number, sample location, species, date, and inclusive fish numbers that correspond with their place on the AWL form (Appendix A4). After sampling, the fish will be moved to the aerated recovery bucket and held until all smolt are swimming normally. Both the recovery and pre-sampling holding buckets will be covered to minimize stress on the fish.

AWL data will be collected and recorded in a notebook dedicated to smolt sampling. Data will then be transferred to AWL forms. Personnel collecting the data will record their names on the AWL form. Instructions for filling out AWL forms can be found in Appendices A5 and A6.

All data (slides, forms) will be forwarded to the Kodiak area office and reviewed throughout the field season. Keep data and samples updated daily in the event that data must be sent to town on short notice. The crew leader will be responsible for editing all AWL forms for errors prior to sending forms to the Kodiak office.

Common mistakes to avoid include:

1. Poorly mounted scales - Too many scales in a smear or slime and debris present when mounting. The rows of scales should not be too close together to avoid confusing scales from two different smolt.
2. Numbering AWL form improperly - For example, if 40 smolt are sampled in one day (day 1), the AWL numbers should be started at AWL 001 for the first 40 smolt sampled (fish 1-40; 8 slides). The next day will start with AWL 002 (fish 1-40) and so on. If there are not 40 smolt to be sampled for that day, smolt sampled the next day will be started on a new AWL form.
3. Damaged AWL forms - do not bend, fold, tape, staple, etc. these forms. Otherwise, the computer will not read them correctly.
4. Scales removed from one fish contaminating the scale smear of the next fish - wipe the scalpel blade off between each fish sampled.

ADULT ENUMERATION AND AGE, SEX, AND LENGTH SAMPLING

The adult weir will be installed, operated and maintained as outlined in the Kodiak commercial fisheries salmon management field camp and weir operational plan, 2008 (Caldentey 2008). Adult sockeye salmon sampling will occur at the weir site throughout the adult escapement. Details and procedures for adult sampling are outlined in the Kodiak Management Area sockeye salmon catch and escapement sampling operational plan, 2008 (Foster 2008).

PHYSICAL DATA

Physical data will be collected daily between 1100 and 1200 hours. Information will be recorded on the *DAILY PHYSICAL OBSERVATION FORM* (Figure 5) and will include water temperature, air

temperature, water depth, percent cloud cover, wind direction and velocity, and precipitation. A depth gauge will be placed upstream of the weir to determine the water level on a daily basis.

OTHER REQUIREMENTS

SAFETY

Each employee will receive CPR and First Aid Certifications as required by the ADF&G Standard Operating Procedures (SOP), prior to assignment to the Afognak project. In addition, each employee will review the required sections of the ADF&G guidelines.

Specific guidelines to review include:

Safety Policy Standards

Building Safety

Field Camp Safety

Aircraft Passenger Safety

Emergency Survival Equipment Required in Aircraft

Boating Safety

Vehicle Safety

Laboratory Safety

Small Tool Handling

Firearm and Bear Safety

Project crew leaders will be responsible for providing the necessary equipment and information to field technicians. The ADF&Gs field safety policy will need to be reviewed by each field crewmember prior to field assignment. Each employee is responsible for reviewing the safety training materials.

This field camp is located in bear country and trash produced from this camp will be handled in a responsible manner. All organic matter will be disposed of in the river. All burnable materials will be burned in the barrel on-site. When burning, the barrel will be closely monitored to prevent grass fires. All inorganic or unburnable materials will be shipped to town via the next available chartered plane, and will be doubled-bagged using regular trash bags before the trash is put on the plane.

TRAINING

In addition to mandatory CPR and First Aid training, all field personnel will receive training on Salmon Sampling Protocols in the field. Also, personnel will be trained in proper use of firearms before departing from town or at the field camp.

RADIO SCHEDULE

During the smolt season (May-June), Kodiak Research office personnel will contact field camps by satellite phone on the dispatch service every day of the week between 1300-1315 (1:00-1:15 PM) hours. After the smolt trap is removed and smolt operations are over the daily

communication schedule will change to coincide with the management weir camps schedule which will be at 0800 and 2000 hours.

Instructions on the operation and transmission of the satellite phone are provided in Appendix B. Crew leaders must train crew members in proper use of the satellite phone and SSB radio. The emergency Coast Guard frequency for the SSB is **4.125 kHz**.

AIR CHARTERS

All air charters will be set up through Kodiak office staff. Appropriate information in regard to charters will be relayed through daily radio contact. It is important to contact office personnel when any data, equipment or other freight will be "back hauled" to Kodiak.

REPORTING

Crew leaders will be responsible for recording all of the job activities and compiling biological data. Hard copies of data forms and a field log will be completed daily in addition to electronic duplicates which will be completed and saved on the provided lap top computer. "Rite in the rain" logbooks will be used while collecting data and data will be transferred to data forms and electronic copies after returning to the cabin. Use a number 2 pencil when filling in the AWL forms. Data will be reported to Kodiak staff via satellite phone. The electronic data will be sent to Kodiak via portable flash cards as planes permit. Data that is sent to Kodiak will be properly packaged and labeled. A one-page report of project activities will be sent to town bi-weekly, or on the next available plane (Appendix C).

CAMP INVENTORY AND CLOSE UP

The Afognak Lake smolt project equipment will be inventoried prior to camp close up. Inventory forms will be provided. Items of high value will be returned to Kodiak and a list will be made of the equipment needed for the next field season. The Salmon Management Biologists will provide direction on properly securing the cabin and out buildings prior to the field crew leaving the camp site for the season.

PHOTO DOCUMENTATION

Crew leaders will be responsible for photo documenting project activities. Specific aspects such as trap installations, weir construction, and other detailed tasks are important to photograph. ADF&G digital are available for use.

TIMESHEETS

Forward timesheets to the KODIAK OFFICE by the 15th and last day of each month! Plan ahead to ensure that timesheets arrive in town on time. To ensure that timesheets are properly filled out, instructions are contained in Appendix D1 and an example of a properly filled out timesheet is provided (Appendix D2). Plan work activities to be completed in a 7.5-hour day; work overtime only if pre-authorized by the project biologist.

Crew leaders should take the time to look over each crewmember's timesheet before sending them to town to ensure that they are properly filled out.

PURCHASING

During the field season, field crews will need additional items (e.g., groceries, fuel, or tools). Small lists can be read over the satellite phone; however, these lists should be limited to just a few items. Blank grocery lists will be sent to the field and the crew leader should remember to

send orders in advance to ensure the correct grocery order for the next supply flight. It should also be remembered that the Afognak Lake budget allocates \$25/day/person and this allocation will not be exceeded. Crew leaders should track grocery expenses and limit the number of requested specialty items. Plan ahead when requesting fuel for heating the camp. In the past, camps have left stoves on during the day while the crew was working outside. This practice is not acceptable and heating units will need to be turned off, when the cabin is unoccupied.

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FIGURES

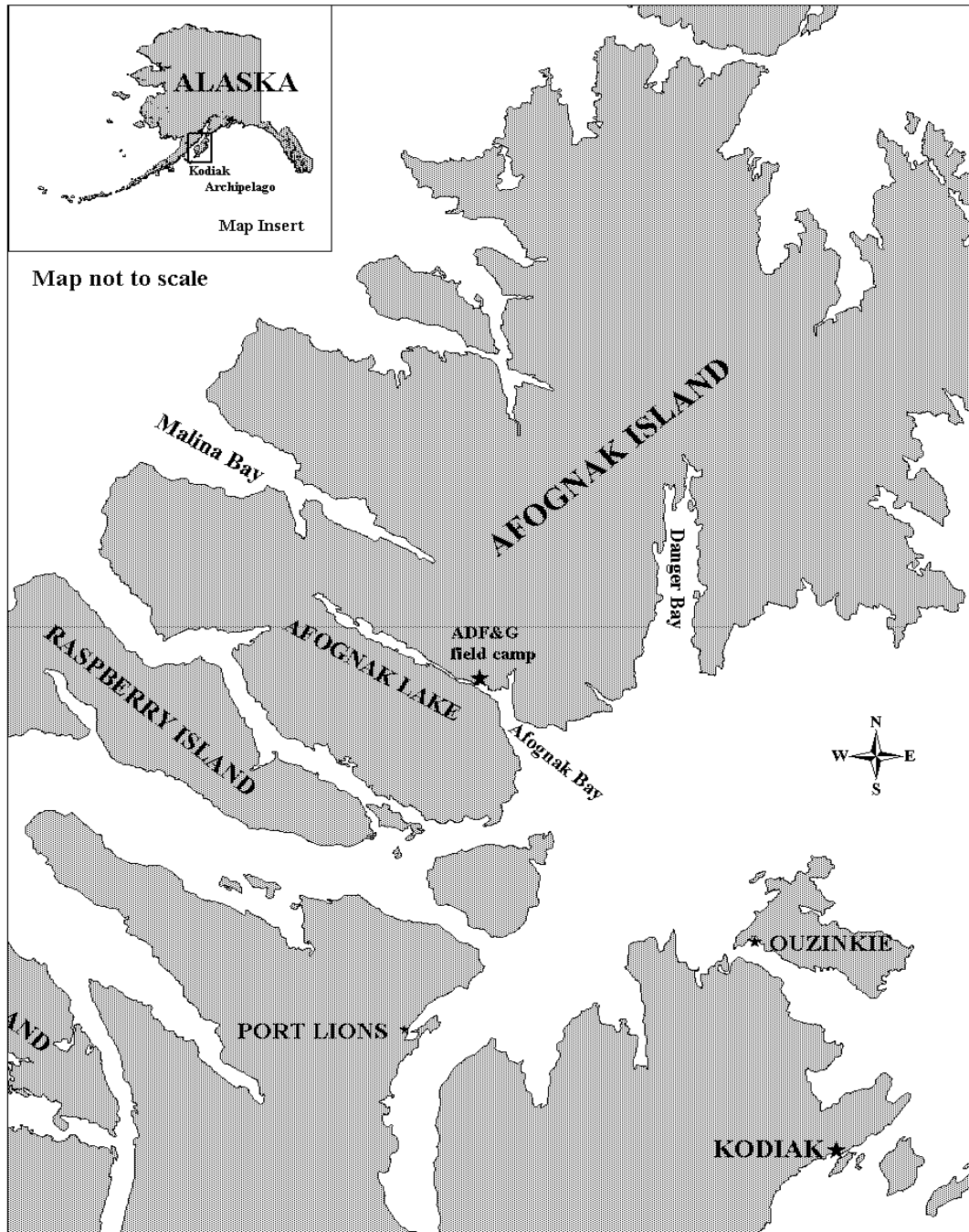


Figure 1.—Location of the ADF&G camp along the Afognak River and Afognak Lake on Afognak Island.

page_____of_____

TRAP LOCATION: AFOGNAK RIVER (ADF&G CABIN SITE)

[illegible]

⁶ To be included in comments: Significant water level changes, any difficulties determining marked fish, problems, observations, etc.

Figure 2.—Daily smolt trap catch reporting form.

SOCKEYE SALMON SMOLT SUMMARY FORM

PROJECT: Afognak

YEAR: 2008

LOCATION: Afognak River (ADF&G cabin site)

[illegible]

¹ Each date covers a 24-hour period extending from noon to noon and identifies the starting date.

² Numbers of fish caught includes mortalities but does not include marked recoveries. Should equal TOTAL CATCH from Daily Smolt Catch Reporting Form.

³ Includes sum of live box morts and trap morts but not marked recovery morts.

⁴ Marked recoveries are not included in the catch because they represent previously caught smolt.

Figure 3.—Sockeye salmon smolt summary form.

SMOLT DYE RELEASE FORM

DATE (actual): _____

CREW NAMES: _____

PROJECT LOCATION: **Afognak** _____

NUMBER OF FISH COLLECTED: _____
(from live box)

	COLLECTION LIVE BOX	TRANSPORT BUCKET	DYE TUB	RECOVERY CONTAINER	STREAM RELEASE
START TIME (military)	time placed in live box	time placed in transport	Start Time	Time placed in recovery	Time to end release
START TEMP (degree celsius)	Temp	Temp	Temp	Temp	Temp
END MORTALITY (number of fish)		# of smolts	# of smolts	# of smolts	
OXYGEN SUPPLEMENT O ₂ or aerator		O2 aerator none	O2 aerator none	O2 aerator none	

DYE SOLUTION (mixture) 2.0g DYE (grams); 15 WATER (gallons)

RELEASE SITE LOCATION (distance upstream of trap): 1240 m

TOTAL NUMBER OF DYED FISH RELEASED: _____

COMMENTS:

DELAYED MORTALITY TEST

Date	Morts

Fish Tested: _____

Total Morts: _____

% Mortality: _____

Figure 4.—Smolt dye release form.

DAILY PHYSICAL OBSERVATION FORM

PROJECT: _____ YEAR: _____ page _____ of _____

DATE	TIME	TEMPERATURE		CLOUD COVER		VISIBILITY	WIND		STREAM	COMMENTS
		AIR (°C)	WATER (°C)	(%)	Ceiling	(mi)	DIRECTION	VEL. (MPH)	(cm)	

Figure 5.—Daily physical observation form.

APPENDIX A. SMOLT AGE-WEIGHT-LENGTH SAMPLING

Appendix A1.—Smolt age-weight-length (AWL) sampling materials and methods.

Annually, outmigrating salmon smolt are sampled for age (scales), weight, and length, by field crews throughout the Westward Region. These data are essential for sound management of the State's salmon resources.

To be useful, data must be recorded on the age, weight, length (AWL) optical scanning (opscan) forms neatly and accurately. In addition, scale samples must be collected and mounted properly to ensure accurate age determination. The following procedures are to be strictly adhered to when sampling juvenile salmon for age, weight, and length.

Complete each section on the left side of the AWL form using a No.2 pencil and darken the corresponding circles as shown in the figures. Make every effort to darken the entire circle as the optical scanner, which reads and records the data from the AWL forms, may not recognize partially filled circles. Be sure to transfer the litho code, located in the left margin on the front side of the AWL form to the back side of the form by darkening the appropriate circles.

Label only one form at a time to avoid a "carbon paper effect" resulting in stray marks. Special care should be used to ensure that stray marks do not occur on either side of the AWL form. Stray marks and scuffed AWL forms can severely hamper scanning. The AWL forms should be treated carefully; the scanner in the Kodiak office cannot read damaged forms. The forms should not be stapled, bent, paper-clipped or folded. Specific instructions for completing AWL forms are listed in Appendix A5 and an example of an AWL form filled out for smolt sampled can be found in Appendix A6.

All juvenile salmon AWL data will be recorded in a field notebook dedicated to smolt sampling. These data will then be transferred from the field notebook to the AWL forms. Each species will have its own AWL sample number series that runs sequentially throughout the season. Up to 40 individual fish per smolt day may be included in one AWL sample. If more than 40 fish are sampled in a single smolt day, then multiple AWL numbers will be used on that day. For example, if 70 sockeye salmon smolt are sampled in a single day (day 1), the AWL numbers will be AWL #001 (fish 1-40; 8 slides) and AWL #002 (fish 1-30; 6 slides). The next day will start with AWL #003. Each day's sample will start with a new AWL number.

Smolt will be sampled as soon as possible after they are captured. The smolt will be transported in clean, 5-gallon gallon buckets to the sampling area. An additional bucket of water will be used as a recovery bucket. Buckets containing smolt will be filled with fresh, clean water and aerated. The buckets will be covered when possible to avoid stress on the fish.

Tricane Methanesulfate (MS-222) will be used to anesthetize the smolt; latex gloves will be worn to prevent direct exposure to the anesthetic. The use of this chemical will be demonstrated by experienced personnel. A small amount (approximately 1 g) of MS-222 and a small amount of baking soda will be dissolved in approximately 2 L of cold water. The amount of anesthetic used will vary depending on the water temperature, freshness of the chemical, and size of the smolt. A few smolt will be placed in the anesthetic solution until subdued to a point where they can no longer flex their axial musculature but can still ventilate their gills. The concentration of the solution should be such that it immobilizes the fish in 2-3 minutes. After the fish are anesthetized, it is important to sample them quickly and place them in a recovery container to prevent mortality.

-continued-

After the smolt have been immobilized, excess water will be gently removed from the fish using a paper towel or a wet sponge as a blotter. Place the fish on its right side to sample the left side. Measure smolt length, to the nearest mm, from tip-of-snout to tail fork (Appendix A3). Record length by blackening the appropriate column circles on the front side of the AWL form. When collecting length data, take care to ensure that each length corresponds to the appropriate scale smear mounted on the slide, as length-at-age is evaluated for each sample. Weigh each smolt to the nearest 0.1 g, and record the weight by blackening the appropriate column circles on the back side of the AWL form.

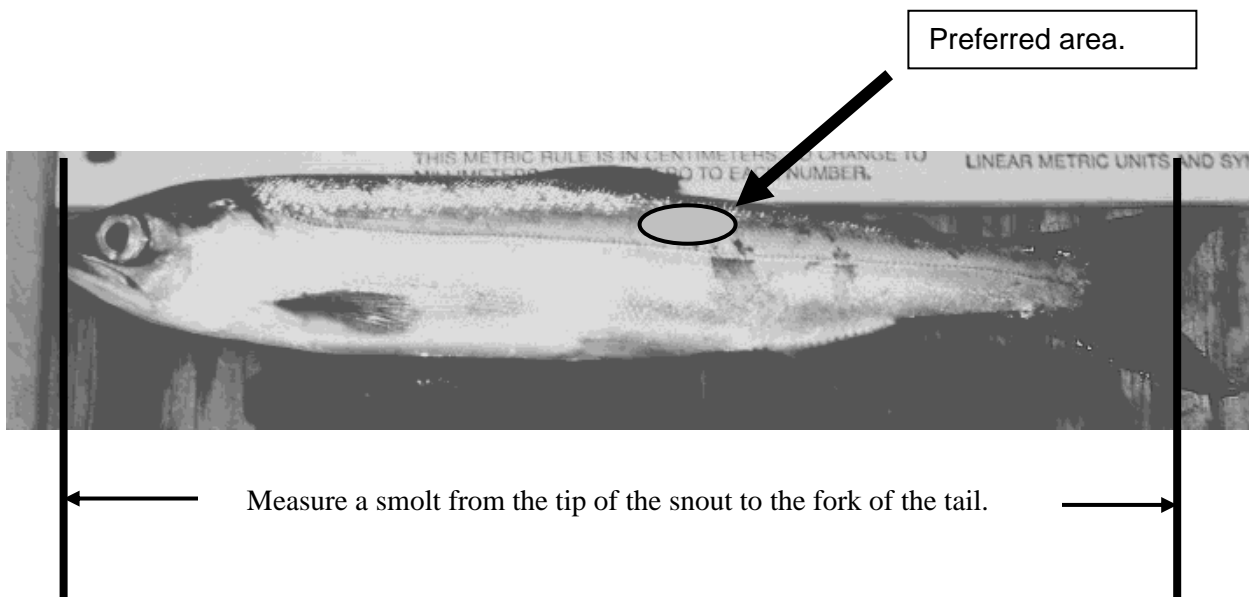
On salmon species, the preferred scale is located where a straight line between the posterior insertion of the dorsal fin and the anterior insertion of the anal fin crosses the second scale row dorsal to the lateral line. In smolt, the area directly around this scale is considered the preferred area (Appendix A3). If scales are not present in this area then scales should be taken from the secondary location, which is the same area on the right side of the fish. A scalpel will be used to remove 5-10 scales from the preferred area. These scales will be mounted on a glass slide using a probe to position the scales. Scales from five fish will be mounted on each slide. The scalpel will be wiped clean of scales and slime between each fish. A diagram of a slide with scales mounted correctly is located in Appendix A4.

The left portion of each slide will be labeled with AWL number, sample location, species, date, and inclusive fish numbers. A diagram of a properly labeled slide is located in Appendix A4. After sampling, fish will be held in a recovery container until they are swimming normally and then released downstream of the trapping location. When the slides are completed, return them to the box in order by AWL # and fish #. Label the slide box on top with the information listed in Appendix A4.

Appendix A2.—Sampling weeks and associated calendar dates.

Week	Calendar Dates	Week	Calendar Dates
10	1-Mar - 7-Mar	28	5-Jul - 11-Jul
11	8-Mar - 14-Mar	29	12-Jul - 18-Jul
12	15-Mar - 21-Mar	30	19-Jul - 25-Jul
13	22-Mar - 28-Mar	31	26-Jul - 1-Aug
14	29-Mar - 4-Apr	32	2-Aug - 8-Aug
15	5-Apr - 11-Apr	33	9-Aug - 15-Aug
16	12-Apr - 18-Apr	34	16-Aug - 22-Aug
17	19-Apr - 25-Apr	35	23-Aug - 29-Aug
18	26-Apr - 2-May	36	30-Aug - 5-Sep
19	3-May - 9-May	37	6-Sep - 12-Sep
20	10-May - 16-May	38	13-Sep - 19-Sep
21	17-May - 23-May	39	20-Sep - 26-Sep
22	24-May - 30-May	40	27-Sep - 3-Oct
23	31-May - 6-Jun	41	4-Oct - 10-Oct
24	7-Jun - 13-Jun	42	11-Oct - 17-Oct
25	14-Jun - 20-Jun	43	18-Oct - 24-Oct
26	21-Jun - 27-Jun	44	25-Oct - 31-Oct
27	28-Jun - 4-Jul	45	1-Nov - 7-Nov

Appendix A3.—Photo of a smolt with the preferred area highlighted.



Appendix A4.—An example of 2 correctly labeled smolt slides representing fish 1 through 10 from a sample collected on 5/11/08.

AWL 001 Sockeye Afognak 5/11/08 Fish #1-5	1				5
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•

AWL 001 Sockeye Afognak 5/11/08 Fish #6-10	6				10
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•
	•	•	•	•	•

When the slides are completed, return them to the box in order by AWL # and fish #, and label the slide box on top with the following information:

Location: Afognak Lake

AWL Number: AWL #001- #00?

Beginning and end dates: 5/11-?/?/08

Sockeye Salmon Smolt

Appendix A5.—Procedure for recording salmon smolt age-weight-length data on AWL forms.

Smolt length and weight will be recorded on AWL forms (Appendix A5). Using a No.2 pencil, complete each section of the left side of the AWL and darken the corresponding ovals.

Fill out each of the following:

Description

Record the following: species, location, year and samplers names (e.g., sockeye smolt, Afognak, 2008, T.Slice Kinsley, C. Mahl).

Card

The AWL forms and corresponding slides are numbered sequentially date throughout the season starting with 001. A new, consecutively numbered AWL form is used each day even if the previous AWL form is not full. There may be a minimum of one fish and a maximum of 40 fish (8 slides) per AWL form.

Species

Refer to the reverse side of the AWL form for the correct one digit code (e.g., sockeye = 2).

Day, Month, Year

Use appropriate digits for the date the fish are sampled.

District

List the district in which the fish were sampled. Consult your area statistical map or project leader for the appropriate district (**Afognak district is 252**).

Subdistrict (Section)

List the subdistrict in which the fish were sampled (**Afognak subdistrict is 34**).

Stream

List the stream in which the fish were sampled. Consult your area statistical map or project leader for the appropriate stream number (**Afognak stream is 342**).

Location

List the location in which the fish were sampled. Consult your area statistical map or project leader for the appropriate stream number (**Afognak location is 034**).

-continued-

Period

List the period (sample week) in which the fish were sampled (Appendix A5).

Project and Gear

Refer to the reverse side of the AWL form for the correct code. For example, smolt samples collected in a trap would have a project code of **8** and a gear code of **00**.

Mesh

Leave blank unless specifically instructed by supervisor to do otherwise.

Type of length measurement

Refer to the reverse side of the AWL form for the correct code (e.g., tip of snout to tail fork = **2**). Refer to Appendix A1.

Number of scales per fish

Fill in the number of scales (smears) collected per fish. For smolt, one scale smear per fish is collected.

of cards

of cards always = 1 (each AWL form is individually numbered).

If possible, keep the AWL forms in numerical order throughout the season and keep all forms flat, dry, and clean. Remember, when sampling smolt, weight data is recorded on the back side of the AWL form and the litho code, located in the left margin on the front side of the AWL form must be transferred to the back side of the form (see Appendix A4). The litho code is the number unique to each AWL form and copying the litho code from the front to the back of the form indicates weight data was transcribed on the back of the form for the Optical scanning machine to read. Fish slime and water curling may cause data to be misinterpreted by the optical scanning machine. It is the responsibility of the crew leader to make sure that all forms are carefully edited before returning them to their supervisor.

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APPENDIX B. SATELLITE TELEPHONE AND DISPATCH INSTRUCTIONS

Appendix B1.—Satellite telephone and dispatch instructions.

The following information serves as a Policy Statement regarding the allowable uses of ADF&G satellite phones and Instructions on the proper method to successfully set up and operate the satellite phone system assigned to your camp.

These systems are not like standard telephones or cell phones, nor are they like a single side band or VHF radio. Communication is sent through the transmitter to low level satellites, then is beamed down to ground stations, either directly to another satellite phone system or to a switching station linked to standard telephone lines. As such, there is a much higher cost involved in operation than with standard telephone long distance or cell phone charges.

Under no circumstances may you use this satellite phone system for personal calls, unless a family or personal emergency exists. This does not mean that field crew leaders may grant permission for personal use of this phone. Only the project biologist may give you such permission. ANY DELIBERATE MISUSE OF THIS SYSTEM, SUCH AS MAKING UNAPPROVED, NON-EMERGENCY, OR PERSONAL CALLS, WILL RESULT IN DISCIPLINARY ACTION, WHICH MAY INCLUDE SUSPENSION OR DISCHARGE.

The primary purpose for having this satellite phone is for secure, reliable communications between remote field stations and ADF&G offices (Kodiak, Chignik, Cold Bay, Sand Point, or Port Moller), ADF&G research vessels (Resolution or K-Hi-C), Fish and Wildlife Protection vessels and offices, or other field camps that are similarly equipped. The secondary purpose is for your SAFETY. With these phones you are capable of directly dialing emergency services at any time of the day or night. It is essential that these phone systems are maintained in good working order, are fully charged or hooked to sufficient power at all times, and remain free for official or emergency use.

INSTRUCTIONS

The portable sat phone unit must be charged with power. There is an internal battery pack, and a 12-volt adapter is available in order to hook the phone to a larger battery bank, that may in turn be recharged by generator or solar panels.

Turn the unit on using the power switch in the lower left corner. A green light, just above the switch, should come on indicating that the unit is sufficiently powered. If no light or a red light comes on, you will need to charge the unit, or attach it to your 12-volt battery bank via the appropriate connections.

The back, or top, of the briefcase-like unit is the antenna, and it must be oriented correctly in order to access the receiving satellite. The top of the case should be open and pointed in a general east-southeast direction. You must have a fairly clear line-of sight to the horizon in that direction; this unit will NOT work through walls or mountains. The angle of the antenna should be almost vertical; remember to lock the support arm that attaches the lid to the main body of the unit, along the right side.

This system has two means for calling; a telephone-like handset (for dial in or dial out phone calls), and a push-to-talk microphone (for 'dispatch', unit to unit, calls). All calls made with the handset are billed per minute of use, at an expensive rate. All calls on the 'AlaskaNet' dispatch system, using the microphone, are essentially FREE.

When first turned on, the handset and microphone should become active, with the display panels on the top of the phone handset and microphone lighting up (one LED panel, hopefully the one on the handset, should read SLEEP). The display will show, after a few moments, whether a connection has been established with the satellite, and how strong the signal is (ex. B05 S 21). Turn the unit slightly, and raise or lower the lid/antenna slightly until the highest possible signal strength is indicated (normally above 20 but will work down to 8). Lock the lid/antenna in place and do not turn the unit again, until your communications are finished. Once a strong signal is acquired push the "*" button for 2 seconds. Wait until there is a "beep" and the LCD screen displays '00:DN ??', then dial the number.

-continued-

Alaska Dispatch System

Because all calls made on the dispatch system are FREE, this is the method of choice for using the satellite phone units. There are several ADF&G offices, many field camps, and two research vessels on the AlaskaNet dispatch system, as well as Fish and Wildlife Protection/State Troopers offices and vessels, plus many canneries, fishing vessels, and tenders. You should have received a 10-12 page directory with your phone.

First, make sure the unit is turned on, and that there is sufficient power. Set the unit up so that the signal strength is at the maximum for your location. You should see the signal strength on the microphone display (ex. *B05 S 21*), and the handset display should read SLEEP. Once a strong signal is acquired push the “*” button for 2 seconds. Wait until there is a “beep”.

On the microphone display, below the signal strength, there should be a query, ‘00:DN ??’. This is asking you to ‘dial’ in the 4-digit dispatch number that you wish to call. After you have entered the 4-digit dispatch number of the unit you wish to contact, hold in the microphone key and a connection will be made with the satellite, which will then try to connect with the dispatch number you punched in. IF a connection is made you will hear two beeps (“bird chirps”) and the microphone display will read SELF. While continuing to hold in the microphone key, call the station you wish to talk to. USE ALL THE SAME FORMALITIES AS WHEN CALLING ON A SSB RADIO. For example, say “Calling the ADF&G Kodiak Office, Calling the ADF&G Kodiak Office; this is Karluk Weir”. When you release the microphone key, the unit will beep again.

BE PATIENT. It will take some time for the signal to go up to the satellite, down to the number you called. It may take the other party some time to get to the microphone and respond (this is especially true for calls to the ADF&G office; supervisors have to walk down to the radio room to respond). When they respond, their 4-digit dispatch number (DN) will show on the microphone display. This is a private conversation, unlike the previous dispatch service.

Just remember to be patient; wait until the other party stops speaking and you hear the unit beep (indicating that they are finished with this portion of their communication), the display should read SELF, and you may key microphone to talk. Then you must again wait for the other party to respond. If the other party is not there, they simply will not answer. If the satellite connection cannot be made, the display will read ‘Unable to Connect’ or ‘Not Available’.

-continued-

Phone System

DO NOT USE THE HANDSET TO PLACE CALLS UNLESS ABSOLUTELY NECESSARY. All calls made with the handset are billed per minute of use, at an expensive rate. Calls should only be made to supervisors, either when radio or dispatch contact is not possible or when a confidential message needs to be relayed. Calls are made by dialing out, almost like a standard telephone. Punch in the area code and telephone number, then PRESS SEND (button located in the upper right corner of the handset). Because there is a satellite relay, there will be a slight delay between when you speak and when the other party hears you, so be patient.

Note EVERY call in a phone logbook. The system will show you the amount of time you've used on the call, on the LED panel. Note the number called, the date, approximate time, and the length of the call (minutes and seconds). When the call is completed, you MUST push the END button (top right corner of handset buttons), otherwise the system will remain active and YOU will be billed for the time (at almost a dollar a minute). Remember, PRESS END.

If someone calls in to this unit, it will ring, like a standard telephone. Press the SEND button to start the conversation, but remember to PRESS END to finish the call. ADF&G is billed for all calls made using the handset, both the calls you dial out and any calls dialed in.

IN CASE OF EMERGENCY:

If there is a medical emergency, or a real danger to life or health, IMMEDIATELY call the US Coast Guard Rescue Coordination Center at 800-478-5555. Be ready to tell them your name, exact location (latitude and longitude or nearby major landmark), and the exact nature of your emergency. They may question you extensively, so be prepared. There are emergency doctors on-call that can advise you. After the call is completed, immediately call your supervisor, at work or at home, and relay the details of your experience.

If there is an enforcement emergency, use the dispatch microphone to call the Kodiak office or the Alaska State Trooper, Fish and Wildlife Protection (DN 6370).

APPENDIX C. WEEKLY REPORT EXAMPLE

Appendix C1.—An example of a weekly report.

To: Rob Baer
Alaska Department of Fish and Game
Fishery Research Biologist
Kodiak, Alaska

Date: May 20, 2006

From: Jason Fox
Alaska Department of Fish and Game
Fish and Wildlife Technician III
Litnik Field Camp

Subject: Activity Report for May 14-20, 2006

Smolt Counts & Sampling

The smolt trap here has been fishing since May 10th, but we saw our first smolt on May 16th. Our cumulative catch thru this week is 83. The run seems to have started later this year due to lake freezing and winter-like conditions in the Kodiak/Afognak area until early May. We also sampled 20 smolt on May 19th as an introductory example for new crewmate Josephine Deguzman. The smolt we sampled had an average length of 81.2mm and an average weight of 4.0g.

Dye Test and Trap Efficiency

We have not yet had enough fish to do a dye release test. As far as putting in the smolt trap is concerned, we were not originally able to get the incline into “optimal” position due to high water conditions at the time of installation. As we found out last year, this may be a problem when *low* water conditions occur, as the catch box may not be able to be lowered any further than a potential high spot that it is currently over. This will be addressed as the season goes on.

Adult Weir Counts

The adult sockeye weir was installed and fish tight at 7pm on the evening of May 19th. Surveys of the lagoon and lower river below the weir revealed no signs of returning adults yet. We have not counted any adults upstream as of yet.

Miscellaneous

River otters have been a very significant nuisance so far this season. We have installed a protective cage around the area between the cod end of the incline where fish drop into the catch box. Last year, this seemed effective. However, the chicken wire tends to gather a significant amount of river debris in high water conditions. This debris buildup also tends to cause an increase in smolt mortality because the smolt have to get through the debris to the catch box.

Anticipated Activities

Crew will have to maintain a clean trap to reduce mortality in smolt. We also are going to monitor adult steelhead out-migration this spring to experiment with effective ways to pass them downstream. We also need to fill sand bags to add to weir and smolt trap to make them more secure and fish tight.

APPENDIX D. TIMESHEET INSTRUCTIONS

Appendix D1.—Instructions for filling out a timesheet.

All ADF&G employees must fill out a time sheet biweekly and these timesheets must be turned in to the Administrative staff in Kodiak in a timely manner. Please follow these instructions when filling out your time sheets to avoid payroll problems. When a flight comes out to drop off groceries, or for any other reason, near the end of a pay period, camp personnel need to send in their timesheets. Fill in the time sheet up to the day you send them in and attempt to project your remaining hours worked.

Fill out each of the following on the top of the timesheet:

Pay period: pay periods start on the 1st or 16th of each month and end on the 15th or end of the month (example: June 1-15 or June 16-30).

SSN: your social security number

Name: full name

Division: Commercial Fish

In the actual timesheet table fill in the following:

Day: Monday, Tuesday, etc.

Date: 6/16, 6/17, etc.

Hours worked box: start and stop time in military time

Code 1: fill in the number of hours worked for that day (see example in Appendix D.2.).

Work hours and Code 1 Totals should both equal the sum of daily hours worked. If your time sheet is sent in before the end of the pay period, project your time for the remaining days so you can total your columns.

Charge to Table located on the bottom left hand side of the time sheet should be left blank unless otherwise instructed by your project supervisor.

Comments Table located on the bottom right hand side of the time sheet should be left blank unless otherwise instructed by your project supervisor.

Employee's signature and date: Be sure to sign and date your timesheet.

Crew leaders are responsible for reviewing each crew member's timesheet before sending them to town to ensure that they are properly filled out.

Appendix D2.-Example of a completed timesheet.

ALASKA DEPARTMENT OF FISH AND GAME Time and Attendance Report

Pay period ending: 6/15/2003

SSN: 191-11-1111

Name: Joe Shmo

Division: Commercial Fisheries

Record times in military format. Example: 6:00 p.m. = 18:00. If you work past midnight, stop at 23:59 and resume at 00:01 the next day.

Day	Date	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Start	Stop	Leave Taken	Sea Duty	Standby	Hazard	Code 1	Code 2	Code 3	Code 4	Holiday / Leave	Work Hrs Total
Sun	6/1	8:00	12:00	13:00	16:30													7.50				0.00	7.50
Mon	6/2	8:00	12:00	13:00	16:30													7.50				0.00	7.50
Tue	6/3	8:00	12:30	14:00	18:00													8.50				0.00	8.50
Wed	6/4	8:00	12:00	13:00	16:30	17:00	19:00											9.50				0.00	9.50
Thu	6/5	8:00	12:00	13:00	16:30													7.50				0.00	7.50
Fri	6/6	8:00	12:00	16:00	19:00													7.00				0.00	7.00
Sat	6/7	8:00	12:00	13:00	16:30													7.50				0.00	7.50
Sun	6/8																					0.00	0.00
Mon	6/9	8:00	12:00	13:00	16:30													7.50				0.00	7.50
Tue	6/10	8:00	12:00	13:00	16:30													7.50				0.00	7.50
Wed	6/11	8:00	12:00	13:00	16:30													7.50				0.00	7.50
Thu	6/12	8:00	12:00	13:00	16:30													7.50				0.00	7.50
Fri	6/13																					0.00	0.00
Sat	6/14																					0.00	0.00
Sun	6/15	8:00	12:00	13:00	16:30	17:00	18:30											9.00				0.00	9.00
TOTALS																0.00	0.00	94.00	0.00	0.00	0.00	0.00	94.00

Charge to:

Notation	CC/LC	%
1		100%
2		
3		
4		
Total		100%

Comments

6/1		6/9	
6/2		6/10	
6/3		6/11	
6/4		6/12	
6/5		6/13	
6/6		6/14	
6/7		6/15	
6/8			

We certify that the information provided above is true and correct.

Joe Shmo

Date: 6/15/03

Employee's Signature

Supervisor's Signature

Approving Officer Signature

Leave Use Codes

H=Holiday X=Comp Ann
S=Sick Y=Comp Pers
A=Annual C=Court
P=Personal L=LWOP

** Premium Pay Codes (PPC)

110 - Sea Duty 250 - Straight Time
206 - Hazard 251 - Overtime
211 - Standby

Holiday, Leave, Overtime and Premium Pay Overrides

**Codes	Hours	CC/LC
Leave & Holiday	0.00	No code needed for Leave & Holiday

Ver. 1.9.4
Revised 2/20/99

Little Waterfall Bay Sockeye Salmon Commercial Fishery Monitoring Project Operational Plan, 2008

by

Steven E. Thomsen

May 2008

Alaska Department of Fish and Game

Division of Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
		north	N	base of natural logarithm	<i>e</i>
		south	S	catch per unit effort	CPUE
		west	W	coefficient of variation	CV
		copyright	©	common test statistics	(F, t, χ^2 , etc.)
		corporate suffixes:		confidence interval	CI
		Company	Co.	correlation coefficient	
		Corporation	Corp.	(multiple)	R
		Incorporated	Inc.	correlation coefficient	
		Limited	Ltd.	(simple)	r
		District of Columbia	D.C.	covariance	cov
		et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
		exempli gratia		expected value	<i>E</i>
		(for example)	e.g.	greater than	>
		Federal Information		greater than or equal to	≥
		Code	FIC	harvest per unit effort	HPUE
		id est (that is)	i.e.	less than	<
		latitude or longitude	lat. or long.	less than or equal to	≤
		monetary symbols		logarithm (natural)	ln
		(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
		figures): first three		minute (angular)	'
		letters	Jan,...,Dec	not significant	NS
		registered trademark	®	null hypothesis	H ₀
		trademark	™	percent	%
		United States		probability	P
		(adjective)	U.S.	probability of a type I error	
		United States of		(rejection of the null	
		America (noun)	USA	hypothesis when true)	α
		U.S.C.	United States	probability of a type II error	
			Code	(acceptance of the null	
		U.S. state	use two-letter	hypothesis when false)	β
			abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
				standard error	SE
				variance	
				population	Var
				sample	var
Weights and measures (English)					
cubic feet per second	ft ³ /s				
foot	ft				
gallon	gal				
inch	in				
mile	mi				
nautical mile	nmi				
ounce	oz				
pound	lb				
quart	qt				
yard	yd				
Time and temperature					
day	d				
degrees Celsius	°C				
degrees Fahrenheit	°F				
degrees kelvin	K				
hour	h				
minute	min				
second	s				
Physics and chemistry					
all atomic symbols					
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity	pH				
(negative log of)					
parts per million	ppm				
parts per thousand	ppt,				
	‰				
volts	V				
watts	W				

REGIONAL INFORMATION REPORT NO. 4K08-5

**LITTLE WATERFALL BAY SOCKEYE SALMON COMMERCIAL
FISHERY MONITORING PROJECT OPERATIONAL PLAN, 2008**

by

Steven E. Thomsen

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May 2008

The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: <http://www.sf.adfg.ak.us/statewide/divreports/html/intersearch.cfm>.

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ADF&G, Sport Fish Division, Research and Technical Services, 333 Raspberry Road, Anchorage AK 99518 (907)267-2375.

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ABSTRACT

Personnel from the Alaska Department of Fish and Game, Division of Commercial Fisheries and the Kodiak Regional Aquaculture Association will monitor the commercial harvest of sockeye salmon *Oncorhynchus nerka* in the Waterfall Bay Special Harvest Area (WBSHA) in 2008. Monitoring duties will include installation and maintenance of a barrier net in the estuary of Little Waterfall Bay, which will prevent sockeye salmon from entering Little Waterfall Creek. Returning sockeye salmon will all be available for harvest in the WBSHA. This operational plan is intended to provide seasonal employees a guide to the responsibilities of the project, which include, installing and maintaining the barrier net, monitoring the harvests, and living safely in a remote camp.

Key words: Little Waterfall Bay, Waterfall Bay Special Harvest Area, escapement, sockeye salmon, Kodiak Management Area, field camp

INTRODUCTION

The Waterfall Lakes early-run sockeye salmon *Oncorhynchus nerka* enhancement project was started by the Alaska Department of Fish and Game (ADF&G) and the Kodiak Regional Aquaculture Association (KRAA) to provide supplemental production for the commercial salmon fishery in the Kodiak Management Area (KMA; Schrof and Honnold 2003). Sockeye salmon juveniles have been annually stocked into Little Waterfall Lake since 1992, and intermittently into Big Waterfall Lake in 1992, 1999-2002, 2005, and 2007. In addition to the stockings, Little Waterfall Lake was fertilized from 1993 through 2001 to maintain a stable zooplankton population. Fertilization was discontinued due to a decline in funding.

The primary function of the Little Waterfall project is for the crew to maintain a barrier net in the Little Waterfall estuary so that the commercial salmon fleet has the opportunity to harvest all available sockeye salmon returning to the Waterfall Bay Special Harvest Area (WBSHA). The WBSHA encompasses the marine environment at the outlets to Little and Big Waterfall Lakes (Figure 1). These systems are located on the northern end of Afognak Island and drain into Perenosa Bay.

Approximately 6,500 sockeye salmon are expected to return as adults to the WBSHA in 2008, all of which will be available for harvest. ADF&G and KRAA will cooperatively operate the Little Waterfall project from approximately May 27th to June 25th. The crew will consist of two technicians hired by KRAA. ADF&G will provide project oversight, training, and logistical support.

This operational plan is a reference and guiding document for the field staff, so that they understand what is expected of them to effectively accomplish the required tasks and duties of the project. Project activities at the Little Waterfall camp will include installation and maintenance of a barrier net, commercial fishery monitoring, and the collection of biological samples (i.e., scales for age, sex, and length) from sockeye salmon harvested in the WBSHA.

PROJECT GOAL

The primary goal of the Little Waterfall Bay project is to maintain the barrier net so that the commercial salmon fleet has the opportunity to harvest all sockeye salmon returning to the WBSHA.

PROJECT OBJECTIVES

1. Install a barrier net in the estuary near the confluence of Little Waterfall Creek to prevent sockeye salmon escapement into Little Waterfall Creek and allow the harvest of all sockeye returning to WBSHA.
2. Estimate the age, length and sex composition of sockeye salmon harvested in the WBSHA.
3. Estimate the sockeye salmon harvest and effort in the commercial fisheries in the WBSHA (statistical area 251-84).

SUPERVISION AND TRAINING

The project biologist, Steven Thomsen, will be responsible for project supervision and providing oversight, logistical, and technical support for the camp operation. The crew leader is responsible for training new employees, establishing work schedules, prioritizing daily work assignments, and supervising camp duties. The crew leader is also responsible for ensuring that accurate, complete, and well organized data are collected, as well as ensuring safety. The crew is required to read and follow this document, the escapement sampling operational plan (Foster et al., 2008), and the following state SOPs: Safety Policy Standards, Building Safety, Field Camp Safety, Aircraft Passenger Safety, Emergency Survival Equipment Required in Aircraft, Vehicle Safety, Small Tool Handling, Firearm and Bear Safety.

PROCEDURES

TASKS

1. Open camp and install barrier net in the Little Waterfall Bay estuary.
Target date: 30 May.
2. Conduct surveys to estimate adult sockeye salmon build up in WBSHA.
Target dates: 29 May – as time permits through end of salmon run.
3. Estimate the daily sockeye salmon harvest and record the number of boats fishing in WBSHA.
Target dates: 05 June - 25 June.
4. Collect 600 scales total from sockeye salmon commercial harvest at WBSHA for age, sex, and length (ASL).
Target dates: 05 June - 25 June.
5. Collect physical data daily: air and water temperature, and weather observations.
Target dates: 29 May - 25 June.
6. Communicate daily with Kodiak ADF&G personnel by satellite telephone or single sideband (SSB) radio.
7. Inventory and secure Little Waterfall camp and close down for the season.
Target Date: 25 June.

OPENING CAMP

Gather the necessary equipment from the ADF&G warehouse prior to departure (Table 1). Upon arrival at camp, the first day of work will consist of opening the field camp facility, organizing, storing supplies and personal gear, setting up the SSB radio, satellite phone, and preparing the necessary gear and equipment for barrier net installation.

BARRIER NET INSTALLATION

A barrier net, approximately 7.3 x 30.5 m long, will be anchored and secured at the most terminal area of Little Waterfall Creek (the bay is actually located between Big and Little Waterfall Bays, and drains Little Waterfall Lake) to prevent sockeye salmon from escaping into Little Waterfall Creek.

The net will be positioned where the bottom contour is smooth and relatively free of debris. In addition, the net will be installed and suspended from a taught line and stretched between two solid anchors on either bank, high above the top of the net. The installation and placement of the net will be similar to past years. A buoyed line will be installed ~15 m in front of the net to serve as a “no fishing zone.” Due to tidal exchange, creek current, salmon pressure, and debris build-up, the barrier seine must be monitored, cleaned, and maintained daily. Precautions must be taken to keep the lead lines from lifting off the bottom. The webbing must be inspected for holes and repaired as needed to maintain “fish-tight” integrity.

FISHERY MONITORING

Fishery monitoring during commercial fishing periods will include boat surveys to assess run strength of sockeye salmon within WBSHA (boat travel outside WBSHA is not permitted). The vessel names, fishing location, and estimated catch by species will be recorded on the *Special Harvest Area Monitoring Form* (Figure 2).

SURVEYS

Surveys of fish build-up in the WBSHA will be conducted after installation of the barrier net. Record the information on the *Special Harvest Area Survey Form* (Figure 3). Additional surveys within the WBSHA should be conducted as weather and time allows.

HARVEST SAMPLING

The sockeye salmon harvest in the WBSHA will be sampled throughout the fishery. A minimum of 600 sockeye salmon (averaging 200 per week) will be sampled for ASL. During the first week of the fishery, the sampling goal may be increased to 400 ASL samples because a majority of the fish will likely be caught at this time. Accurate records of fish sampled will be kept on the *Special Harvest Area Fishery Monitoring Form* (Figure 2). Refer to Appendix A and Foster et al. (2008) for procedures on how to sample adult salmon properly and fill out optical scanning (Opscan) forms.

OTHER REQUIREMENTS

DAILY RADIO SCHEDULE

Little Waterfall camp personnel will contact Kodiak Research office personnel by Iridium Satellite phone at 1315-1330 (1:15-1:30 PM) hours Monday through Sunday. If contact cannot be made with the Iridium Satellite phone, office personnel will contact the camp by SSB radio frequency 3.230 MHz. In an emergency, the Coast Guard can be reached on the SSB at frequency 4.125 MHz or by Iridium Satellite phone at 800-478-5555. Instructions for operation of the Iridium phone are provided with the phone case. All members of the camp should be familiar with both methods of communication. Advise your supervisor if you plan to miss a radio schedule.

DAILY FORMS

In addition to the *Special Harvest Area Fishery Monitoring Form* and the *Special Harvest Area Survey Report Form*, the crew leader will fill out a *Daily Physical Observation Form* (Figure 3), Opscan forms, and maintain a camp log (“rite in the rain” booklet) every day.

TIME SHEETS

Crew leaders are responsible for keeping an accurate record of employees work hours. Each employee will fill out a KRAA timesheet by the 15th and the last day of each month. Time sheets need to be sent into town when the camp has a resupply flight. Field crew must plan ahead to ensure that timesheets are completed prior to resupply. If unusual circumstances arise that require overtime, the crew leader must notify the project leader immediately.

CAMP INVENTORY AND CLOSING CAMP

Before closing camp, inventory gear, supplies, and fuels that remain on site. See Table 2 for the camp closing inventory. Winterizing the cabin should include (but is not limited to): covering windows, covering and insulating propane connections, closing and locking all doors, winterizing all motorized equipment, and chaining and locking the boat in a secure location.

SEASON SUMMARY REPORT

The Crew leader is responsible for writing a short end of season summary report. The report will summarize weekly activities, sampling, boat activity, problems with the barrier net, and suggested improvements or needs for the next field season. Keep a daily log of project activities in the camp log for reference.

ADDITIONAL GUIDLINES AND PROCEDURES

CAMP POLICIES

- Alcoholic beverages are not to be stored in areas open to public view. If alcohol is consumed at a camp the employee must be 21 years of age or older and off work without any duty scheduled for the remainder of the day and under no circumstances shall he or she engage in the operation of any equipment, nor shall he or she return to duty status under the influence of alcohol. The abuse of alcoholic beverages will be grounds for immediate dismissal.
- All employees will be required to act in a professional manner at all times and be especially courteous to the public.
- Injuries must be reported to the project supervisor within 24 hours.
- Loss or damage of equipment must be reported to the project supervisor within 24 hours.

ORDERING FOOD AND SUPPLIES

Field crews will purchase items prior to leaving Kodiak and may also request items (e.g., groceries, supplies, and equipment) while in the field. Little Waterfall camp is scheduled to have one grocery/supply flight around June 16th. Before leaving Kodiak complete a resupply food order and give a copy to the camp supply personnel or project supervisor. Be sure to keep a copy for your reference. Items can be added to the resupply list during the normal phone (radio) schedule at 1315 hours each day.

Alcoholic beverages, personal grooming supplies, newspapers, magazines, and tobacco must be purchased with personal funds. Please limit personal requests.

FIREARMS

All field camp employees must be able to safely use firearms. A firearm will be provided for camp use. Training on safe handling and shooting of firearms will be conducted for all personnel. Loaded guns (with a round in the chamber of the gun) are prohibited inside camp facilities. **Anyone handling a firearm should always treat it as if it is loaded.** Clean guns frequently. Make certain that firearms are completely unloaded while doing so. Firearms will be stored on site in a location out of reach of the public. Any misuse of firearms will not be tolerated and may be cause for immediate dismissal. Always unload a firearm of all ammunition and leave the chamber open before boarding a vehicle, vessel, or aircraft.

GARBAGE

Completely burn garbage to prevent attracting bears. Do not burn during windy or dry weather conditions. Never start fires with fuel. To prevent grass fires keep grass and brush trimmed to at least fifteen feet away from the burn barrel. It is best to burn trash early in the morning or late in the evening when the wind is minimal and humidity is high. Never leave a fire unattended.

Tin cans should be burned with burnable garbage to eliminate residual food and odors that attract bears. Send in burnt cans and non-burnable items on supply flights. All garbage that is sent to town must be double bagged. Empty fuel containers should also be sent in as soon as possible on return grocery flights for immediate recycling.

Biodegradable garbage should be placed into a slop bucket (food scraps, etc.) and dumped away from camp either in the river or bay. Don't compost biodegradable food because it attracts bears.

FIRST AID AND FIRE SAFETY

All crew members will take a mandatory CPR and First Aid training course prior to going in the field. The crew leader will ensure a fully stocked first aid kit and fully charged, operable fire extinguishers are in camp, and that all personnel know where they are located and how to use them. Make sure smoke and carbon monoxide alarms are installed and operational.

DRINKING WATER

Stream and lake water may be contaminated with bacteria or harmful parasites. A "Micron" water filter is provided in the camp to filter all drinking water. If filter cartridges are damaged, replace them immediately. If filters are not available, boil your drinking water for at least 10 minutes. Be sure to read the instruction manual with each filter for cleaning and care information.

BOATING AND ATVs

The camp is furnished with a boat and ATV. They have been provided to transport materials, supplies, and equipment between the campsite and supply planes or vessels. They are also for transportation to and from assigned sites of field duties, such as surveys, fishery monitoring, or collecting harvest information. They are not intended for personal use or recreational purposes. Boats and ATVs may be accessed and operated only by trained personnel and will be secured when not in use.

All personnel must wear United States Coast Guard approved Personal Flotation Devices (life jacket, float coat, or exposure suit) at all times when operating boats. If you suspect conditions may be dangerously rough, don't go out on the water. A waterproof Emergency Positioning Indicator Radio Beacon (EPIRB), the Iridium Satellite phone, a flare kit, and a tool kit (that includes wrenches, pliers, screw drivers, spare spark plugs, and spark plug wrench) must be in the boat at all times.

Unauthorized use of an ATV or boat will result in a notation on your evaluation or your dismissal from employment.

- Personal flotation and communication devices are required while operating a boat.
- A safety helmet must always be worn when riding an ATV.

MAINTENANCE

Outboard motors and generators must be kept in good operating condition and require regular maintenance. At the end of each season, equipment should be winterized and tagged with a description of the equipment's condition on the tag. See Appendix B for instructions on operation and maintenance of outboards and generators.

Cabin and facility maintenance is an important aspect of camp life; the buildings and fish passes must be kept structurally sound and safe. Make a list of projects and repairs that need to be accomplished during the season. Send in a list of materials needed for these projects/repairs. Order supplies in advance. Repairs and maintenance should be scheduled on days when fish harvest is slow to keep this work within normal work periods.

COMPLIANCE WITH ADF&G REGULATIONS

All employees are responsible for complying with local subsistence, sport fishing, and hunting regulations. Copies of State and Federal regulations will be available to all field camp personnel and kept in camp. Any violation will be recorded on your evaluation and may be cause for immediate dismissal.

VIOLATIONS

If a violation is observed, all information pertaining to the violation should be recorded immediately and retained by the employee. The project leader must be notified. If you have a camera, record as much as possible on film.

The use of the five Ws can aid in obtaining sufficient information pertaining to a violation.

1. What is the violation?
2. When did the violation take place?
3. Where did the violation occur?
4. Who is in violation and who are the witnesses?
5. Why was the violation committed?

If the violator refuses to cooperate with an employee without enforcement authority, no action should be taken, other than to relay all information and evidence collected to the project leader.

EMERGENCIES

In the event of a medical emergency, administer first aid to stabilize the situation. If an injury is life threatening immediately notify the US Coast Guard at **800-478-5555** (the dispatch is available 24/7) on the Iridium satellite phone. The US Coast Guard can also be reached on SSB radio frequency 4.125 MHz or on VHF channel 16.

When contacting the U.S. Coast Guard, have the following information ready to pass along:

- Location of your field camp or specific location of the emergency (58°23'31.00 N, 152°30'32.00 W),
- Name and phone number of supervisor,
- General nature of medical emergency,
- Number of patients,
- Specific information regarding the patient (name, age, primary complaint, and vital signs),
- Your assessment and treatment,
- Wind and weather conditions, and
- Other information pertinent to a possible medical evacuation.

REFERENCES CITED

- Foster et al. 2008. Kodiak Management Area sockeye salmon catch and escapement sampling operational plan, 2008. *In* Salmon research operational plans for the Kodiak Area, 2008. Alaska Department of Fish and Game, Regional Information Report 4K08-05, Kodiak.
- Schrof, S., and S.G. Honnold 2003. Salmon enhancement, rehabilitation, evaluation, and monitoring efforts conducted in the Kodiak Management Area through 2001. Alaska Department of Fish and Game, Regional Information Report 4K03-41, Kodiak.

TABLES AND FIGURES

Table 1.—Little Waterfall Bay camp equipment and supply list.

Field equipment for the Little Waterfall Bay project stored at the ADF&G warehouse on Rezanof Drive.

1. Visqueen or tarp - Use to keep equipment and supplies covered when you arrive or depart from field camp.
2. Boat - Make sure oars, bow line, and drain plug are included.
3. Outboard motor - Make sure you have the proper fuel hose and tank for your motor. Test the motor prior to departure from town.
4. Outboard gas tank, hose, oil & gas - Gas tanks and hoses are stored in the fuel shed. Make sure you have the proper fuel hose and tank for your motor. Don't forget 2-cycle oil for the motor. Be sure to know the correct mixture of your motor. Take at least 3 containers of gas, preferably one tank and two 5-gallon containers.
5. Boat kit - A water tight box should include: Spare spark plugs, lower end lube, fuel filter, hose connectors, hose clamps, seine twine, tool kit, outboard oil, cable ties, metal wire, fuel pump diaphragms and a flare kit.
6. Personal floatation – A mustang suit or float coat is required for every employee when using the boat.
7. Propane tanks – The cabin cook stove and refrigerator use propane. Propane tanks are stored in the fuel shed (take 2 20# tanks). Make sure propane tanks are full.
8. Lantern fuel and mantles - Remember to bring lantern fuel (1 gallon can should be sufficient) and extra mantles.
9. SSB radio - Make sure the radio suitcase contains the black coaxial cable, 12-volt power cable, antenna (3.230 MHz frequency) and spare fuses.
10. Iridium Satellite Phone – Make sure battery is good and that it is activated. Be sure to take the phone instructions and contact numbers.
11. 12 Volt battery - Make sure to charge battery; battery testers are available at the office (Battery must be transported in a case).
12. Stove oil - Use only #1 heating oil (take 30 gallons).
13. Firearm & cleaning kit - Shotguns, ammunition, and gun cases are available at the office; check with Steven Thomsen, Switgard Duesterloh, or Rob Baer. Know how to clean, load, and carry the firearm safely.
14. Emergency/ safety equipment - EPIRB, rescue light, first aid kit, and helmet. A helmet is required when using the 4-wheeler.
15. Field paper work – Take enough copies of all forms, timesheets, food list, and office supplies for the season. Can be obtained from Steven Thomsen, Switgard Duesterloh, or Rob Baer.
16. Sampling gear- Scale cards, measuring tape, tweezers, write in the rain books, polarized glasses, gloves, chest waders and wading boots.
17. Groceries - Purchase sufficient groceries for approximately two weeks, plus some extra quick meals in case supply flights are delayed. When selecting groceries consider the weight and bulk of your items.
18. Personal gear - Warm clothes, sleeping bag, rain gear, personal grooming supplies, alarm clock, and books.

At the end of the field season, please make sure all equipment from your camp is put away properly and in the correct place. If you choose to return next season, this may again be your gear.

Table 2.—Example of a camp closing inventory.

CAMP CLOSING INVENTORY	
Camp: Little Waterfall	
Date 5/25/2008	

Little Waterfall Bay field camp closing inventory. Only listed items need to be inventoried.

1. Stove oil.	List the quantity stored at the camp.
2. Propane.	List the quantity stored at the camp.
3. Outboard fuel.	List the quantity stored at the camp.
4. 2 cycle oil.	List the quantity stored at the camp.
5. 12 volt batteries.	List the quantity stored at the camp.
6. Lantern fuel.	List the quantity stored at the camp.

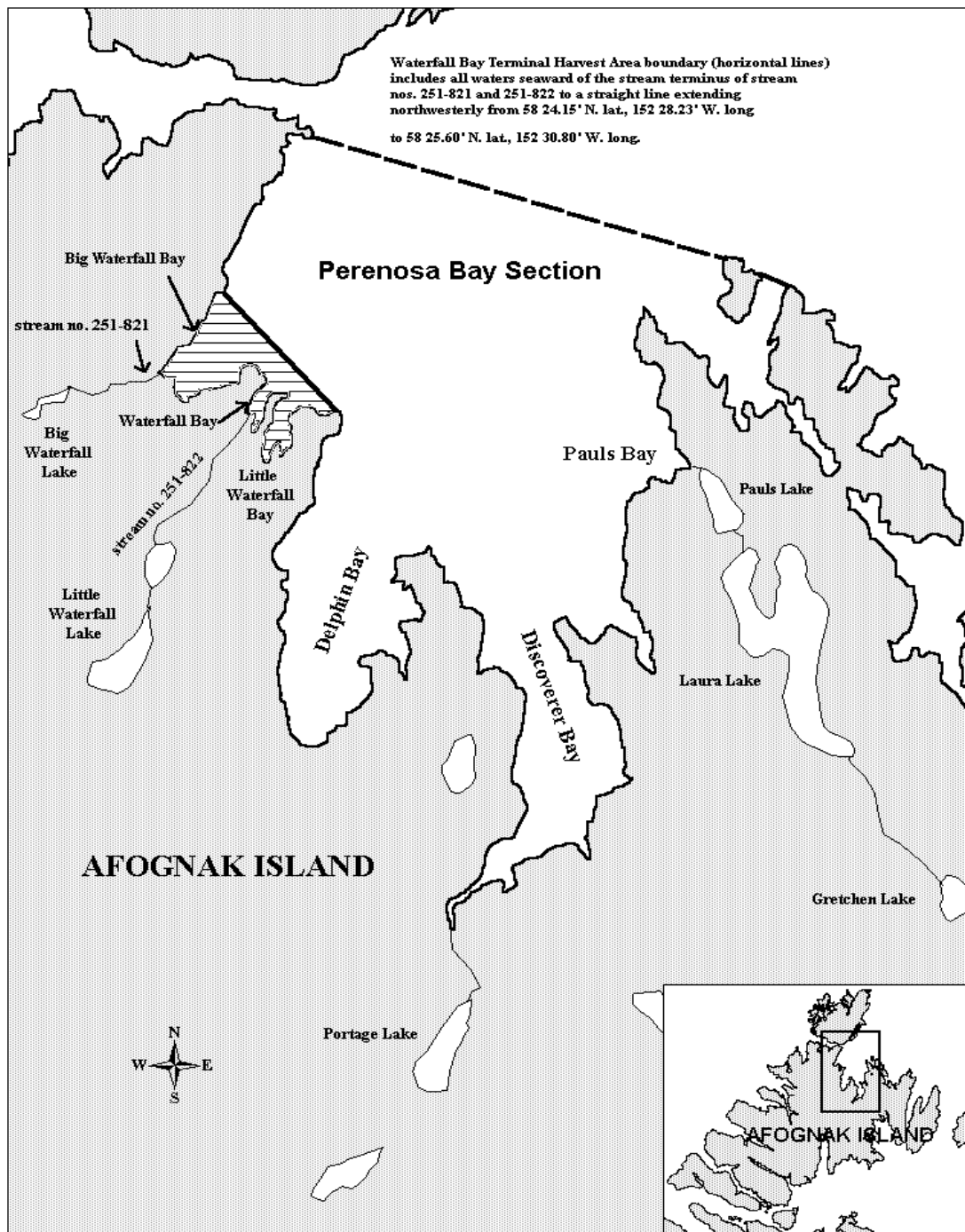


Figure 1.—Location of Little Waterfall Bay on Afognak Island.

13

Figure 2.—Special Harvest Area fishery monitoring form.

Figure 2.—Special Harvest Area fishery monitoring form.

Special Harvest Area Survey Report Form

Page_____of_____

[illegible]

Figure 3.—Special Harvest Area survey report form.

Daily Physical Observation Form

PROJECT: _____

YEAR: _____

[illegible]

Figure 4.—Daily physical observation form.

APPENDIX A. ADULT SAMPLING

Appendix A1.—Procedure for sampling adult salmon for age, length, and sex.

Annually, salmon escapements and catches are sampled for age (scales), length, and sex by field crews throughout the State. This database is essential for sound management of the State's salmon resources.

To be useful, data must be recorded on the age, sex, length (ASL) optical scanning (Opscan) **green** forms neatly and accurately. In addition, scale samples must be collected and mounted properly to ensure accurate age determination. The following procedures are to be strictly adhered to when sampling adult salmon for age, length, and sex.

PROCEDURES

COMPLETING THE OPSCAN ASL FORMS:

A completed OPSCAN form and accompanying scale gum card for sampling sockeye salmon are shown in Appendix A2.

Complete each section on the left side of the OPSCAN form using a No.2 pencil and darken the corresponding circles as shown in the figures. Make every effort to darken the entire circle as the optical scanner, which reads and records the data from the OPSCAN forms, may not recognize partially filled circles. Label only one form at a time to avoid a "carbon paper effect" resulting in stray marks. Special care should be used to ensure that stray marks do not occur on either side of the OPSCAN form. Stray marks and scuffed OPSCAN forms can severely hamper scanning.

Fill out each of the following:

Description

Record the following: species/area/catch or escapement/gear type (if applicable)/samplers.

Card

The OPSCAN forms and corresponding gum card(s) are numbered sequentially by date throughout the season starting with 001. A separate numbering sequence will be used for each species, district, and geographic location. Consult your crew leader for the current card number. Sockeye salmon scale samples will have only one gum card per OPSCAN form as shown in Appendix A2.

Species

Refer to the reverse side of the OPSCAN form for the correct one-digit code (e.g., sockeye = 2).

Day, Month, Year

Escapement sampling: Use appropriate digits for the date the fish are sampled.

Catch sampling: Use the date the fish were caught. If this differs from the sample date, note the sample date in the top margin.

District

List all districts in which the fish were caught. Consult your area statistical map or project leader for the appropriate district. If more than one district is represented, darken the corresponding circles of the district representing most of the catch and note the other catch areas in the top margin.

Subdistrict (Section)

List all subdistricts in which the fish were caught. If the catch represents more than one section, list each section but do not darken the corresponding circles. Leave blank if the section is unknown.

Stream

Leave blank for catch sampling;

Consult area statistical map for the appropriate stream number when collecting escapement samples.

Location

List the appropriate code associated with the area the fish were sampled as shown in Appendix A4. For example, if the fish were sampled in the Port of Kodiak, the location code would be 031.

Period

Escapement sampling: List the sample week in which the fish were sampled (Appendix A5.).

Catch sampling: List the sample week in which the fish were caught. If this differs from the week the fish were sampled, note this in the top margin.

Project and Gear

Refer to the reverse side of the OPSCAN form for the correct code. For example, escapement samples collected at a weir would have a project code of 3 and a gear code of 19.

Mesh

Leave blank unless specifically instructed by supervisor to do otherwise.

Type of length measurement

Refer to the reverse side of the OPSCAN form for the correct code (e.g., mideye to tail fork = 2). Refer to Appendix A6.

Number of scales per fish

Fill in the number of scales collected per fish. For sockeye, one scale per fish is collected unless otherwise instructed by supervisor.

of cards

of cards always = 1 (each OPSCAN form has an individual and unique “litho code”).

If possible, keep the OPSCAN form litho codes in numerical order throughout the season and keep all forms flat, dry, and clean. Fish gurry and water curling may cause data to be misinterpreted by the optical scanning machine. **It is the responsibility of the crew leader to make sure that all forms are carefully edited before returning them to their supervisor.**

SCALE GUM CARDS

A completed OPSCAN form and accompanying gum card for sampling sockeye salmon are shown in Appendix A2. When collecting two scales per fish, as with coho salmon sampling, follow the procedure illustrated in Appendix A3. Be sure to fill out the gum cards in pencil as shown in Appendix A2 and A3.

Species

Write out completely (e.g., sockeye).

Locality

Escapement sampling: Include the weir site followed by “escapement” (e.g., Karluk River escapement).

Catch sampling: Include the area(s) where the fish were caught followed by “catch” (e.g., Uganik Bay catch).

Statistical Area Code

Fill in the appropriate digits from the OPSCAN form. If catch samples are from a variety of statistical areas be sure to list each statistical area and approximate percentage from each (if available).

Sampling date

Escapement sampling: Fill in the date the fish were sampled.

Catch sampling: Fill in the date the fish were caught. The sample date, if different from the catch date, may be noted in “remarks”.

Gear

Write out completely. If catch samples include multiple gear types, be sure to list each gear and approximate percentage from each (if available).

Collector(s)

Record the last names of each person collecting the sample.

Remarks

Record any pertinent information such as the number of scales per fish sampled, processing facility where the sampling took place, vessel/tender name, etc. Be sure to transfer this information to the top margin of the OPSCAN form.

SAMPLING PROCEDURE

1. Place the fish on its right side to sample the left side.
2. Determine the sex of the fish (escapement sampling only) and darken M or F in the sex columns. If any difficulty is encountered with this procedure, write "I had trouble sexing these fish" on the top margin of the OPSCAN form and ask your supervisor for help as soon as possible before sexing additional fish.
3. Measure fish length in millimeters from mideye to tail fork (escapement sampling only; Appendix A6). Record length by blackening the appropriate column circles on the OPSCAN form. Column 3 on the OPSCAN form is used for fish with a length greater than 999 millimeters (Chinook). Measure all species of salmon to the nearest mm. When collecting length data, take care to ensure that each length corresponds to the appropriate scale mounted on the gum card, as length-at-age is evaluated for each sample.

4. Remove the "preferred scale" from the fish by grasping the scale's exposed posterior edge with forceps and pulling free (Appendix A7). Remove all slime, grit, and skin from the scale (neoprene wristers work well for this). The preferred scale is located on the left side of the fish, two rows above the lateral line on the diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. If the preferred scale is missing, select a scale within the preferred area on the other side of the fish. If no scales are present in the preferred area on either side of the fish, sample a scale as close to the preferred area as possible and darken the 8 under "age error code" on the OPSCAN form. Do not select a scale located on the lateral line.
5. It is important to take care that scales adhere to the gum card, rough side up. Therefore, without turning the forceps over, clean, moisten, and mount the scale on the gum card with your thumb or forefinger. Exert just enough pressure to spread and smooth the scales directly over the number as shown in Appendix A7. The ridges on the sculptured side can be felt with a fingernail or forceps. Mount the scale with the anterior end oriented toward top of gum card. All scales should be correctly oriented on the card in the same direction (Appendix A8.).
6. Repeat steps 1 through 4 for up to 40 fish on each OPSCAN form.
7. When sampling at weirs you may use "Rite in the Rain"® books to record the data. Keep the OPSCAN forms in camp where they will be clean, dry, and flat. After sampling is done for the day, transfer the data to the OPSCAN forms. **Each length, sex, and scale must correspond to a single fish! It is the responsibility of the crew leader to be sure the data has been transcribed correctly and the OPSCAN forms filled out completely. Log books containing length and sex data should be returned to Matt Foster at the end of the season.** These are considered raw data and need to be archived. If you choose to record raw data on tape, these tapes must be returned to Matt Foster.

SAMPLING CHECKLIST

OPERATIONAL PLAN	PENCILS (NO. 2)
GUM CARDS	FORCEPS
OPSCAN FORMS (GREEN)	PLASTIC CARD HOLDERS
NEOPRENE WRISTERS	CLIPBOARD
MEASURING BOARD	LOG BOOK (Rite-in-the Rain)

SOME REMINDERS

1. For greater efficiency in scale reading, mount scales with anterior end toward top of gum card.
2. OPSCAN forms should be carefully edited. Remember to use the new OPSCAN forms (green) as the red and blue forms are outdated. Re-check header information on OPSCAN forms; make sure all available information is filled in. Take extra care to use the correct period code (sampling week) for the sampling or catch date. OPSCAN form numbers should not be repeated; a frequent error is to begin a week's sample with the last OPSCAN number used the week before. This is particularly important if the data is regularly sent to town; it is easy to forget which OPSCAN form numbers were used. Crew leaders should take time to ensure that the circles are being blackened correctly. If the circles are sloppily marked, the optical scanner records the information incorrectly or misses it entirely.
3. Transfer important comments from the gum cards to the OPSCAN forms. After pressing scales, the cards are seldom referred to again, and important remarks can be lost. Write comments in the top right margin. If there is not room on the OPSCAN form to completely explain the remarks, use a separate piece of paper.
4. Never put data from different dates on one OPSCAN form or one gum card. Even if only one scale is collected that day, begin a new OPSCAN form and gum card the next day.
5. If weights are taken, they may be noted in the right margin of the OPSCAN form during sampling, but be sure to transfer the weights and litho code to the appropriate columns on the reverse of the OPSCAN form before submitting it to your supervisor.
6. Try to keep the litho codes (located in the left margin of the OPSCAN form) in numerical order. This should not be hard to do if they are arranged that way before page numbering. When sampling different areas throughout the season, arrange the litho codes in order before each sample is taken.
7. If OPSCAN forms get wrinkled or splotted the data should be transcribed onto a new OPSCAN form prior to sending in. The optical scanning computer will misread or reject torn or wrinkled sheets. Do not use paperclips on OPSCAN forms.
8. Be careful when collecting and mounting scales in wet conditions (rain, high humidity, etc.). If glue dries on top of the scale, it often obscures scale features, resulting in an unreadable scale. In addition, scales frequently adhere poorly to a wet gum card. Protect the cards and keep them dry to avoid having to remount the scales on a new card. If the cards get wet, try to dry them in a protected area or remount if necessary. Remember, use a pencil when filling out gum cards, because ink will come off during pressing.
9. Visually scan all OPSCAN forms for mistakes. A common error occurs, for instance, in placing both the 4 and 7 of a 475mm fish in the 100s column with nothing in the 10s column.

10. Avoid accumulation of incomplete OPSCAN forms. In previous years, there have been cases where individuals have completed several samples before transcribing the information on the OPSCAN forms. This may lead to an increase in errors. After a sample has been completed, try to get the OPSCAN forms filled out as soon as possible. This will ensure more accurate information, as any problems or abnormalities concerning the sample (e.g., many jacks in sample, many fish lacking preferred scale, number of scales do not match number of lengths recorded, etc.) will be fresh in your mind.
11. Responsibility for accuracy lies first with the primary data collector(s) and finally with the crew leader. Sloppy or incomplete data forms or gum cards will be returned to individual collectors for correction.

Appendix A2.—Completed adult salmon OPSCAN form (front side) and associated gum card.

Species: Sockeye Card No: 014

Locality: Frazer Esc.

Stat. Code: 257-40-403

Sampling Date: Mo. 06 Day 07 Year 2000

Gear: Weir/Trap

Collector(s): D. Roberts, C. Selby

Remarks: _____

DESCRIPTION: Sockeye \ Frazer \ Esc.

CARD: 014

SPECIES: Sockeye

DAY: 07

MONTH: 06

YEAR: 2000

DISTRICT: 257

SUBDISTRICT: 40

STREAM: 403

LOCATION: 038

PERIOD: 24

PROJECT: 3

GEAR: 19

MESH: _____

TYPE OF LENGTH MEASUREMENT: 2

NUMBER SCALES/ FISH: 1

OF CARDS: 1

Samplers: Roberts, Selby

ADF&G ADULT SALMON AGE-LENGTH FORM VERSION 2.1

#	SEX	100's	LENGTH	1's	AGE GROUP	AGE ERROR CODE
1						
2						
3						
4						
5						
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11						
12						
13						
14						
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Mark Refers to NCS MM200002-1 3 PE33 Printed in U.S.A.

DO NOT WRITE IN THIS MARGIN

15429

Appendix A3.—Assigned port and weir location codes.

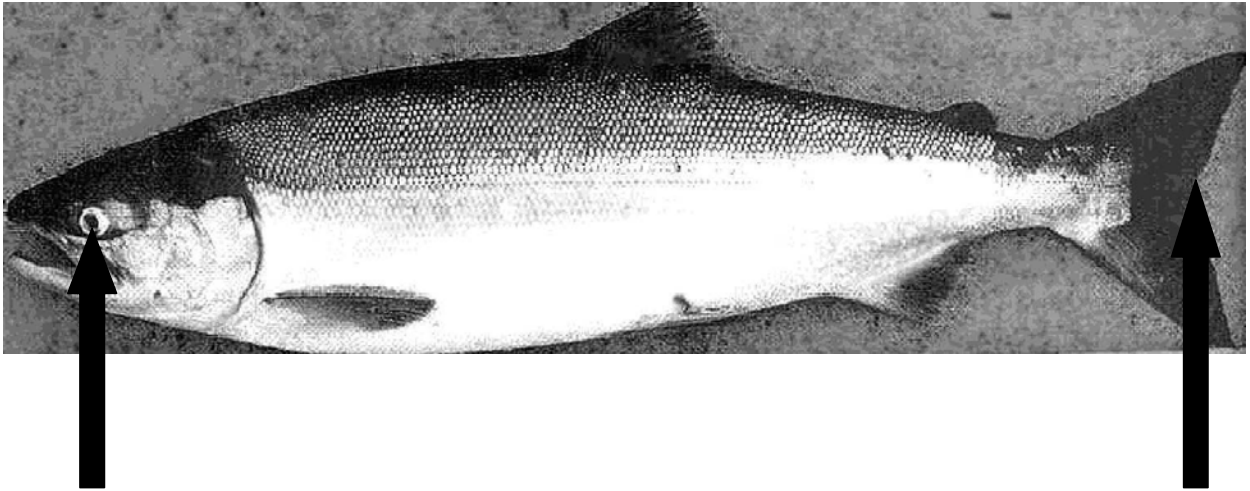
PORT AND LOCATION CODES

028	Saltery	047	Little Kitoi
029	Uganik	048	Waterfall Bay
030	Lazy Bay	049	Little River
031	Port of Kodiak	050	King Cove
032	Pauls Lake	051	Port Moller
033	Thorsheim	052	Dutch Harbor
034	Afognak River	053	Akutan
035	Karluk River	054	Sand Point
036	Ayakulik (Red River)	055	Bear River
037	Upper Station	056	Nelson River
038	Frazer Lake	057	Canoe Bay
039	Dog Salmon	058	Ilnik Lagoon
040	Akalura River	059	Orzinski River
041	Uganik River	060	Sandy River
042	Malina Creek	061	Thin Point Lagoon
043	Portage Lake	062	Middle Lagoon
044	Foul Bay	070	Black Lake
045	Larsen Bay	071	Chignik Weir
046	Spiridon	072	Chignik (Processing facilities)

Appendix A4.–Sampling weeks and associated calendar dates, 2008.

Week	Calendar Dates	Week	Calendar Dates
10	1-Mar - 7-Mar	28	5-Jul - 11-Jul
11	8-Mar - 14-Mar	29	12-Jul - 18-Jul
12	15-Mar - 21-Mar	30	19-Jul - 25-Jul
13	22-Mar - 28-Mar	31	26-Jul - 1-Aug
14	29-Mar - 4-Apr	32	2-Aug - 8-Aug
15	5-Apr - 11-Apr	33	9-Aug - 15-Aug
16	12-Apr - 18-Apr	34	16-Aug - 22-Aug
17	19-Apr - 25-Apr	35	23-Aug - 29-Aug
18	26-Apr - 2-May	36	30-Aug - 5-Sep
19	3-May - 9-May	37	6-Sep - 12-Sep
20	10-May - 16-May	38	13-Sep - 19-Sep
21	17-May - 23-May	39	20-Sep - 26-Sep
22	24-May - 30-May	40	27-Sep - 3-Oct
23	31-May - 6-Jun	41	4-Oct - 10-Oct
24	7-Jun - 13-Jun	42	11-Oct - 17-Oct
25	14-Jun - 20-Jun	43	18-Oct - 24-Oct
26	21-Jun - 27-Jun	44	25-Oct - 31-Oct
27	28-Jun - 4-Jul	45	1-Nov - 7-Nov

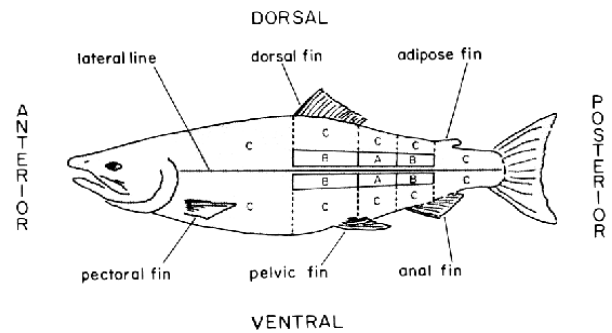
Appendix A5.—Measuring fish length from mideye to tail fork.



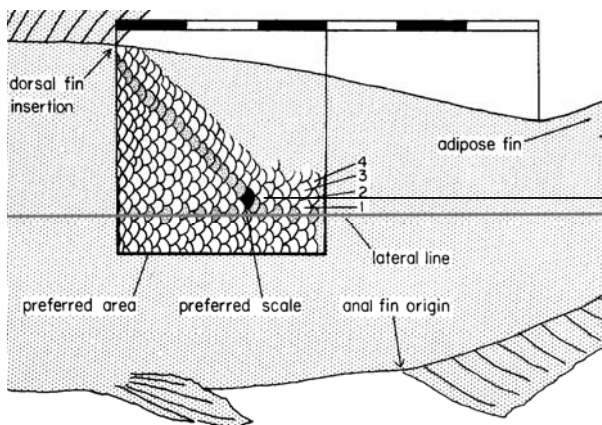
Adult salmon length is measured from mideye to tail fork because the shape of the salmon's snout changes as it approaches sexual maturity. The procedure for measuring by this method is as follows.

- 1) Place the salmon flat on its right side (on the measuring board) with its head to your left and the dorsal fin away from you.
 - 2) Slide the fish in place so that the middle of the eye is in line with the edge of the meter stick and hold the head in place with your left hand.
 - 3) Flatten and spread the tail against the board with your right hand.
 - 4) Read and record the mideye to tail fork length to the nearest millimeter.
-

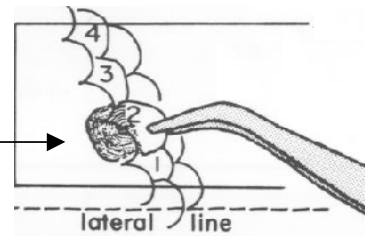
Appendix A6.—Removal and mounting of the preferred salmon scale.



INPFC rated areas for scale removal Area A is the preferred area. If scales on the left side are missing, try the right side. Area B is the second choice if there are no scales in area A on either side of the fish. Area C designates non preferred areas.



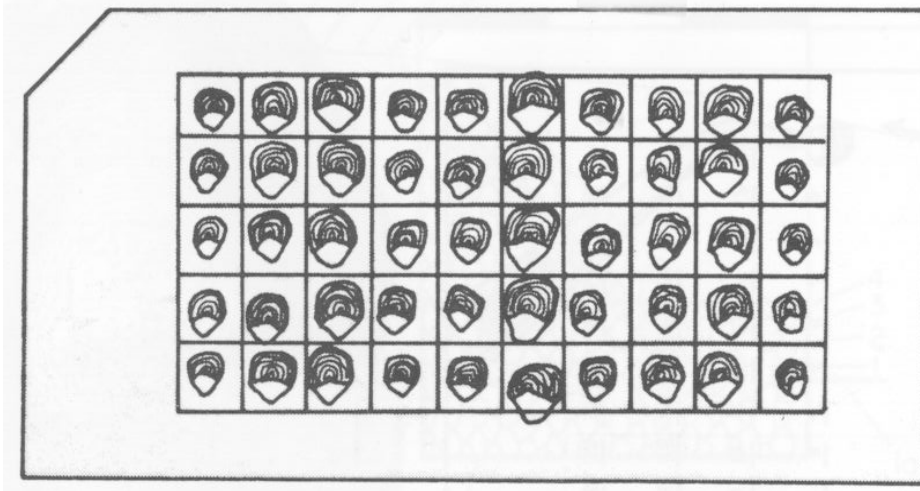
Do not turn scale over.



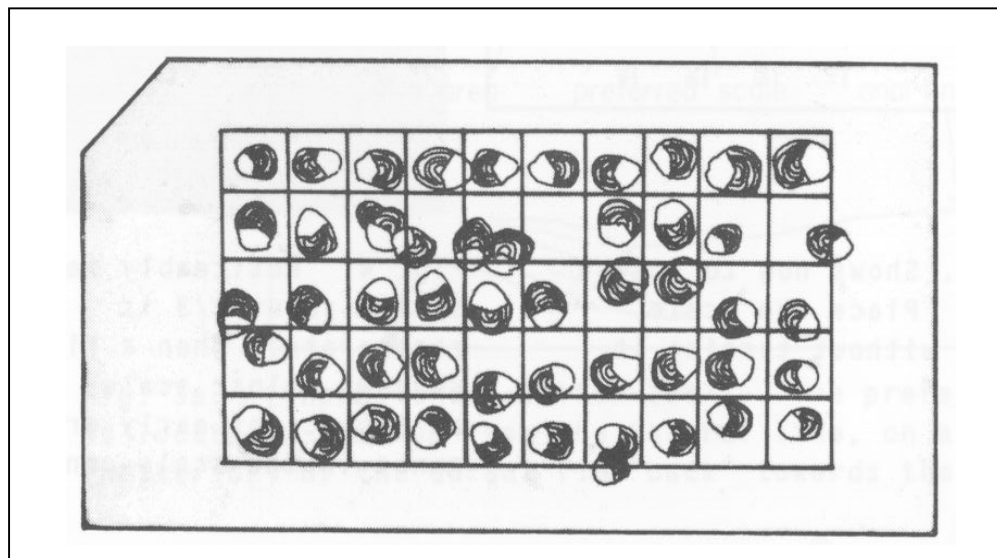
The preferred scale in this diagram is solid black. It is located 2 rows up from the lateral line, on a diagonal from the insertion (posterior) of the dorsal fin “back” toward the origin of the anal fin.



Appendix A7.—Scale orientation on the salmon scale gum card.



The scales are all correctly oriented on the card in the same direction, with the anterior portion of the scale pointed toward the top of the card and the posterior portion (which is that portion of the scale held in the forceps) pointed toward the bottom of the card.



The scales are incorrectly oriented in different directions. This increases the time spent to age samples.

**APPENDIX B. GENERAL EQUIPMENT AND CAMP
MAINTENANCE.**

Appendix B1.– General equipment and camp maintenance.

Outboard Operation

- The correct outboard motor fuel mixture for our standard 2-stroke engines is 100:1. Always pour the oil into the tank first, then add 2 or 3 gallons of gas and mix thoroughly, then fill tank to capacity always using a large funnel and chamois filter.
- Always mix fuel under cover to prevent water contamination and always use a funnel and filter.
- Always place the outboard motor in neutral when starting or shutting off the engine. Always make sure a safety line is attached to the boat and motor, in case the motor detaches from the transom.
- Perform a check daily of the screw clamps that hold the outboard to the transom. Also routinely check the motor for loose screws and bolts, cracks, and breaks, especially in the area of the lower unit.
- Never start or run the outboard in the fully upright position.
- In the normal operation of an outboard, a stream of water is discharged from a hole in the bottom rear edge of the cowling or from the back of the shaft. If this stream of water stops, the water pump is not working and the motor should be shut off. Check the water intake and water discharge tube under the cowling, they may be clogged.
- If your outboard will not start, check the following:
- Make sure the on/off switch and safety "kill switch" clip is in the on position
- Check to see if the fuel line is connected to the motor and the tank and not pinched or kinked, and that the air vent on the tank is open.
- Check to see if there is water in the gasoline.
- If the engine is flooded, wait five minutes for the plugs to dry before attempting to start again.
- Check the spark plugs, they may be fouled or defective (replace if needed), also check for corroded, loose, or disconnected wires.
- All outboards are to be tilted in the up position when not in use.
- At the end of the season, winterize all outboard motors by changing the lower unit oil, remove and clean or replace spark plugs, and fog the engine.
- Boats are to be kept clean and free of loose tools and debris. Pull the boat out of the water at the end of each day. A running line can be used, if needed, but frequently it gets in the way of commercial boats.
- Maintain a bowline on each boat and ensure that each boat is properly moored at the end of each workday.

Generators

A portable generator is available for use at the camp. Their maintenance follows the same line as outboards. Generators have 4-cycle engines; mixed gas must not be used. The crankcase oil reservoir should be checked daily and maintained at the full level. After 25 hours of operation the oil should be changed. Spark plugs should be checked every season for fouling and gap.

Saltery Weir Operational Plan, 2008

By

Steven E. Thomsen

April 2008

Alaska Department of Fish and Game

Division of Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
		north	N	base of natural logarithm	<i>e</i>
		south	S	catch per unit effort	CPUE
		west	W	coefficient of variation	CV
		copyright	©	common test statistics	(F, t, χ^2 , etc.)
		corporate suffixes:		confidence interval	CI
		Company	Co.	correlation coefficient	
		Corporation	Corp.	(multiple)	R
		Incorporated	Inc.	correlation coefficient	
		Limited	Ltd.	(simple)	r
		District of Columbia	D.C.	covariance	cov
		et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
		exempli gratia		expected value	<i>E</i>
		(for example)	e.g.	greater than	>
		Federal Information		greater than or equal to	≥
		Code	FIC	harvest per unit effort	HPUE
		id est (that is)	i.e.	less than	<
		latitude or longitude	lat. or long.	less than or equal to	≤
		monetary symbols		logarithm (natural)	ln
		(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
		figures): first three		minute (angular)	'
		letters	Jan,...,Dec	not significant	NS
		registered trademark	®	null hypothesis	H ₀
		trademark	™	percent	%
		United States		probability	P
		(adjective)	U.S.	probability of a type I error	
		United States of		(rejection of the null	
		America (noun)	USA	hypothesis when true)	α
		U.S.C.	United States	probability of a type II error	
			Code	(acceptance of the null	
		U.S. state	use two-letter	hypothesis when false)	β
			abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
				standard error	SE
				variance	
				population	Var
				sample	var
Weights and measures (English)					
cubic feet per second	ft ³ /s				
foot	ft				
gallon	gal				
inch	in				
mile	mi				
nautical mile	nmi				
ounce	oz				
pound	lb				
quart	qt				
yard	yd				
Time and temperature					
day	d				
degrees Celsius	°C				
degrees Fahrenheit	°F				
degrees kelvin	K				
hour	h				
minute	min				
second	s				
Physics and chemistry					
all atomic symbols					
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity	pH				
(negative log of)					
parts per million	ppm				
parts per thousand	ppt,				
	‰				
volts	V				
watts	W				

REGIONAL INFORMATION REPORT NO. 4K08-5

SALTERY WEIR OPERATIONAL PLAN, 2008

By

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April 2008

The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: <http://www.sf.adfg.ak.us/statewide/divreports/html/intersearch.cfm>.

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ABSTRACT

The Alaska Department of Fish and Game Division of Commercial Fisheries and Kodiak Regional Aquaculture Association will operate Sallery weir in 2008. Sallery weir is used to estimate salmon escapements into Sallery Lake. This information assists the ADF&G management staff in their decisions to open and close the salmon fisheries throughout the season. This operational plan will advise seasonal employees of their responsibilities in order to run effective field camps, operate weirs, and live at a remote site.

Key words: Sallery Lake, weir, escapement, salmon, Kodiak Management Area, field camp

INTRODUCTION

This operational plan will advise Kodiak Regional Aquaculture Association (KRAA) seasonal field camp employees of their responsibilities for opening the field camp, instructs them on preparing, maintaining, installing, and operating the weir, and provides tips on how to effectively accomplish required tasks, duties, and responsibilities. KRAA employees will also read the escapement sampling operational plan (Foster, *In prep*) and the Standard Operating Procedures (SOP) pertinent to their position.

Sallery weir (Figure 1) is approximately 120 feet long located about one quarter mile below the outlet of Sallery Lake on the northeast side of Kodiak Island. The weir was seasonally operated from 1988 to 2002. The weir will be operated in 2008 from approximately June 25th to August 8th by KRAA personnel with oversight by the Alaska Department of Fish and Game (ADF&G).

KRAA conducts egg takes from fish stocks in the Sallery Lake system. The fish transport permit (FTP) for these egg takes is due to expire in 2008. Operation of the weir is needed as part of that review process.

KRAA personnel will enumerate adult salmon escapement and collect biological samples from sockeye salmon escapements (i.e., scales for age, sex, and length (ASL). Detailed sampling instructions are located in Foster (*In prep*).

GOAL

The primary goal of Sallery weir is to enumerate salmon escapement so ADF&G can ensure that the escapement goal is met, and that commercial fisherman have an opportunity to harvest surplus salmon.

OBJECTIVES

1. Enumerate adult salmon escapement through the weir and estimate salmon build-up below the weir in the river, lagoon and bay.
2. Monitor escapement quality, including the numbers of net-marked and “jack” (salmon \leq 400 mm mid-eye to tail fork) sockeye salmon.
3. Conduct escapement sampling.

DUTIES

1. Install, operate, and maintain the weir and field facilities.

2. Provide timely information on salmon escapement into the river system by enumerating salmon species as they pass through the weir.
3. Estimate concentrations of fish below the weir in the river, lagoon, and bay.
4. Collect representative scale samples from salmon escapements for ASL composition ratios and estimates.
5. Collect and maintain accurate data, and transmit reports on a timely basis.

METHODS AND PROCEDURES

OPENING CAMP

Gather the necessary equipment from the ADF&G warehouse prior to departure (Table 1). Upon arrival at camp, the first day of work will consist of setting up the weather port tent, organizing, storing supplies and personal gear, setting up the single sideband (SSB) radio, satellite phone, and preparing the necessary gear and equipment for weir installation. Weir installation, operation, maintenance, and removal procedures below were adapted from Caldentey, (2008).

WEIR INSTALLATION

- Transport all weir materials from Kodiak to the Saltery weir site.
- Bolt together all tripods.
- Move tripods from their staged location into the river and evenly space them across the river.
- Line up and square the tripods perpendicular to the upstream river flow.
- Fine tune tripod spacing and leveling. Level each tripod by digging under the highest rear leg to level it out. Leveled tripods make it easier to install and level your boardwalk.
- Install the entire boardwalk shiplap on the posterior portion of the tripod arms; do not nail it down until it is all leveled. Start at one end of the weir laying a 2"x 12" x 14' board across the first set of tripod arms ensuring it rests on the next consecutive tripod arm. Continue laying out the boardwalk the length of the weir.
- Level boardwalk with spacers or leveling blocks nailed to the tripod arm, and fine tune the straightness of the boardwalk. Toenail the boardwalk to tripod arms and toenail the boards that overlap one another together, with 16d duplex nails. Make sure the end of each individual board rests on a tripod arm.
- Place large rocks or sandbags on each tripod platform to weight them down.
- Install upper and lower stringers in an alternating pattern across all tripods and extending to the riverbanks on both ends of the weir.
- Begin installing weir panels. Lay each panel flat against the stringers with the base of the panel up off the riverbed approximately 10 inches. Rake and dig a channel in the river bottom to set the panel into. Once a channel is dug, set the panel into the channel and make sure it is straight and level. Next, backfill the channel with stream gravel and rock to ensure it is fish tight. Continue setting weir panels the length of the weir.

- Don't forget to install counting gate frames along with your weir panels. Determine counting gate locations based on stream depth and river flow. Typically install them where water flow is greater and depth is adequate for fish passage.
- Tie off the upper portion of all weir panels to the upper stringer with seine twine or cable ties.
- Install flash panels in front of and against each counting gate on the river bottom and weight down with large rocks or sandbags.
- Inspect your work. Walk along the front of the weir backfilling the base of panels where necessary to ensure the weir is fish tight.

WEIR OPERATION

- Monitor weirs throughout the day to pass fish. The crew leader will organize a schedule.
- If you don't have experience identifying fish, your crew leader will train you to visually recognize the different salmon species and their swimming patterns. When fish have accumulated behind the weir take time to visually study them and note differences as they pass through the weir.
- Open a gate and begin counting fish with handheld tally counters, one for each species. Regulate the gate opening by using a wedge to lock the gate into position. If you open the gate too far, fish will pass through quickly and you will not be able to accurately count and identify them.
- If a counting gate will not open, it is probably locked up by gravel or a rock wedged into the framework. Do not attempt to force the gate, or the entire framework may pull out of place along with the flash panel. Free up the gate by inspecting for wedged rock or gravel and removing it with your fingers or a fish pew.
- When counting fish and conducting surveys, wear polarized glasses for greater visual recognition and eye protection from the sun's reflection off of the water.
- Periodically check your tally counters to ensure they are working properly.
- When you are done counting make sure the counting gate is closed completely.

WEIR MAINTENANCE

- The weir must be cleaned and inspected daily. Debris build up on the weir may cause poor water flow, leading to scouring at the base of weir panels and weir washout during periods of high water.
- Cleaning the weir includes getting into the river to remove sticks, logs, leaves, grass, gravel and fish carcasses.
- Throw all debris over the weir, allowing it to flow down river.
- Inspect the weir to ensure it is fish tight, look for scoured holes, panels out of place, gaps that are too large between panels, sandbags that have been pushed off of tripods by bears, and make sure flash panels are in place and secure.
- Make sure the framework of the weir is sound and secure. If you find any of the boardwalks loose, any section or parts of the weir broken by bears or unsafe, repair it immediately.

- If water levels increase considerably you may need to pull weir panels to avoid a weir wash out.
- Keep bears away and off of the weir as much as possible to minimize damage.

WEIR REMOVAL

- Remove counting seats and “keep off weir” signs.
- Remove all sandbags from tripods and place half of them on one side of the river and the other half on the other side of the river.
- Cut and remove all seine twine or cable ties attaching the weir panels to the upper stringers.
- Remove all weir panels, counting gates, and flash panels, placing them on the rear of the tripods. Place all the weir panels, gates, and flash panels on the south side of the river well above winter ice flows.
- Remove all upper and lower stringers and store in the same location.
- Remove all duplex nails securing the boardwalk, then move all sections of the boardwalk and store in the same location.
- Remove all tripods and stage in the same location.
- Remove all sandbags from the river.
- Stage weir materials in a location to avoid damage from flooding, and ice movement during spring break-up.

ESCAPEMENT SAMPLING

Sockeye salmon age, sex, length (ASL) sampling will consist of 240 fish per statistical week (Wednesday through Tuesday). Preferably, 80 samples will be collected each Wednesday, Friday, and Monday. Adjustments should be made if required to obtain the desired 240-sample size per week. ADF&G salmon research staff will provide field crews a salmon escapement sampling operational plan (Foster, *In prep*). Refer to this plan for sampling guidelines and procedures. Ask a weir camp project supervisor if you have any sampling questions.

SUPERVISION AND TRAINING

The project biologist Steven Thomsen is responsible for project supervision providing oversight, logistical, and technical support for the weir operation. The crew leader is responsible for training new employees, establishing work schedules, prioritizing daily work assignments, and supervising camp duties. The crew leader is also responsible for collecting accurate, complete, and well organized data, as well as ensuring safety. The crew is required to read and follow this document, the escapement sampling operational plan (Foster, *In prep*), and the following state SOP's: Safety Policy Standards, Building Safety, Field Camp Safety, Aircraft Passenger Safety, Emergency Survival Equipment Required in Aircraft, Vehicle Safety, Small Tool Handling, Firearm and Bear Safety.

Daily Radio Schedule

ADF&G salmon management staff requires the previous days counts and cumulative salmon escapement information to be reported each morning at approximately 8:10 AM on single side band (SSB) frequency 3.230 MHz to the Kodiak ADF&G office. A second management radio schedule occurs at 4:30 PM to check on field personnel, discuss salmon build up and

escapements, to pass along short lists of supply requests, and receive the latest commercial fishery announcements. ADF&G salmon research staff may also require a daily radio schedule. Radio schedules are very important, and must be taken seriously. Failure to make two consecutive radio schedules may result in a flight to the camp to ensure the safety of the crew. Advise your supervisor if you plan to miss a radio schedule.

Use the satellite phone if the radio will not operate. You may also contact someone at the Kodiak ADF&G during normal working hours on SSB frequency 3.230 MHz. The satellite dispatch phone can also be used for communicating with the office when SSB reception is poor. Refer to Appendix A for satellite phone and dispatch instructions and Appendix B for instructions on operating your electrical system.

Forms

The crew leader will fill out a *Daily physical observation form* (Figure 2), a *Weekly weir camp report* (Figure 3), a *Weekly crew report* (Table 2), and maintain a camp log. The *Weekly weir camp report* includes daily escapement data that occurred during the past week. The *Weekly crew report* will keep the project supervisor informed on fish estimates, conflicts between crew or public, and the duties accomplished during the past week. Entries to the reports should be made daily.

Time Sheets

Crew leaders are responsible for keeping an accurate record of employees work hours. Each employee will fill out a KRAA timesheet on the 15th and the last day of each month. Field crew must plan ahead to ensure that timesheets are completed prior to resupply. If unusual circumstances arise that require additional overtime, the crew leader must notify the project leader immediately.

Closing Camp

Only weir parts (tripods, panels, lumber) will be left on site after camp close-up.

ADDITIONAL GUIDELINES AND PROCEDURES

Camp Policies

- Alcoholic beverages are not to be stored in areas open to public view. If alcohol is consumed at a camp the employee must be 21 years of age and off work without any duty scheduled for the remainder of the day and under no circumstances shall he or she engage in the operation of any State equipment, nor shall he or she return to duty status under the influence of alcohol. The abuse of alcoholic beverages will be grounds for immediate dismissal.
- All employees will be required to act in a professional manner at all times and be especially courteous to the public.
- Injuries, and loss or damage of state equipment must be reported to the project supervisor within 24 hours.

Ordering Food and Supplies

Field crews will purchase items prior to leaving Kodiak and may also request items (e.g., groceries, supplies, and equipment) while in the field. Crews will only purchase items authorized by the project leader. Grocery and supply flights are scheduled twice a month. Order enough food to eat healthy but be reasonable. If grocery orders become unreasonable, less expensive items will be

substituted. Grocery and supply orders must be in the Kodiak office at least one week prior to the scheduled flight. Grocery forms/ordering lists are provided to keep track of needed items.

Alcoholic beverages, personal grooming supplies, newspapers, magazines, and tobacco must be purchased with personal funds.

Visitors/Public Interaction

The weir site will get many visitors. Visitors come by the camp to watch fish passing through the weir. Keep the camp clean and be courteous and helpful to visitors, but also inform them of the boundaries. The general public is not allowed to access the weir. Make sure “keep off weir” signs are posted in visible locations at both ends of the weir. Remember, your primary role is to operate and maintain the weir and accomplish the associated responsibilities of the project. Under no circumstance should any state employee accept payment or gratuities for such tours or public contact.

Firearms

All field camp employees must be able to safely use firearms. A state owned shotgun will be provided at each camp. Training on safe handling and shooting of firearms will be conducted for all personnel. Loaded guns (with a round in the chamber of the gun) are prohibited inside camp facilities. **Anyone handling a firearm should always treat it as if it is loaded.** Clean guns frequently. Make certain that firearms are completely unloaded while doing so. Firearms will be stored on site in a location out of reach of the public. Any misuse of firearms will not be tolerated and may be cause for immediate dismissal. Always unload a firearm of all ammunition before boarding a vessel or aircraft.

Bears

Bears are present at the weir camp. Do not antagonize bears and make every attempt to coexist with them. Each bear is a potential danger. Do not encourage bears to come near camp by leaving food or unburned garbage around. Make sure you burn trash completely and maintain a clean camp. If you are having problems with a particular bear notify your supervisor. When attempting to frighten a bear away by shooting, shoot away from the bear because you may inadvertently wound it. Do not shoot a bear unless, in your best judgment, it is endangering someone's life. Do not shoot unless it is absolutely necessary. If a bear is shot, notify your project supervisor immediately. If a bear hangs around or on the weir and will not leave, cracker shells can be loaded and shot in the approximate direction of bears, but not at bears. Rocks may also be used at your discretion, keeping in mind that a bear is a potential danger.

Garbage

Burn garbage completely to prevent bear problems. Do not burn during windy or dry weather conditions. Never start fires with fuel. To prevent grass fires keep grass and brush trimmed at least fifteen feet away from the burn barrel. It is best to burn trash early in the morning or late in the evening when the wind is minimal and humidity is high. Never leave a fire unattended.

Burn tin cans along with burnable garbage. Burning cans eliminates residual food and odors that attract bears. Send in burnt cans and non-burnable items on supply flights. All garbage must be double bagged. Empty fuel containers should also be sent in as soon as possible on return grocery flights for immediate recycling.

Use a slop bucket for biodegradable garbage (food scraps, etc.) that is dumped away from camp either in the river or bay. Don't compost biodegradable food because it attracts bears.

Fire and First Aid Safety

All crew members will take a mandatory CPR and First Aid training course prior to going in the field. Ensure a fully stocked first aid kit and fully charged, operable fire extinguishers are in camp, and that all personnel know where they are located and how to use them. Make sure smoke and carbon monoxide alarms are up and operational.

Drinking Water

Stream and lake water may be contaminated with bacteria or harmful parasites. “Micron” water filters are provided in field camps to filter all drinking water. If filter cartridges are damaged, replace them immediately. If filters are not available, boil your drinking water for at least 10 minutes. “Be sure to read instruction manual with each filter for cleaning and care information.”

ATVs

Saltery weir is furnished with a ATV. The ATV has been provided to transport materials, supplies, and equipment between campsites and supply planes or vehicles. They may be used for transportation to and from assigned field duties, such as surveys, fishery monitoring, or collecting harvest information. They are not intended for personal use or recreational purposes. ATVs may be accessed and operated only by trained ADF&G personnel and will be secured when not in use. Be safety conscious at all times; do not speed or drive recklessly.

Unauthorized use of an ATV will result in a notation on your evaluation, and the discontinuation of ATV use at your field station, or your dismissal from employment.

- Only state employees may use the vehicles and ATV.
- Only one employee may ride on an ATV at a time.
- A safety helmet must always be worn when riding an ATV.

Compliance with ADF&G Regulations

All employees are responsible for complying with local subsistence, sport fishing, and hunting regulations. Copies of State and Federal regulations will be available to all field camp personnel. Any violation will be recorded on your evaluation and may be cause for immediate dismissal.

Emergencies

In the event of a medical emergency, administer first aid to stabilize the situation. If an injury is life threatening immediately notify the US Coast Guard, at their Search and Rescue Emergency phone number **800-478-5555** on the satellite phone. The US Coast Guard can also be reached on SSB radio frequency 4.125 MHz or on VHF channel 16.

When contacting the U.S. Coast Guard, have the following information ready to pass along:

- Location of your field camp or specific location of the emergency (see below),
- Name and phone number of supervisor,
- General nature of medical emergency,
- Specific information regarding the patient (name, age, primary complaint, and vital signs),
- Your assessment and treatment,
- Wind and weather conditions, and
- Other information pertinent to a possible medical evacuation.

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TABLES AND FIGURES

Table 1.—Equipment and supply list.

Field equipment for the Saltery weir project is stored at the ADF&G warehouse on Rezanof Drive.

1. Weatherport tent –Make sure you have all the parts.
2. Visqueen or tarp - Use for tent ground cloth, and to keep equipment and supplies covered when you arrive or depart from field camp.
3. Cook stove & hose - Check to assure it works. Propane tanks are in the fuel shed.
4. Cooler - .
5. Lantern - Remember to purchase lantern fuel, and extra mantles. Make sure it works.
6. SSB radio - Make sure the radio suitcase contains the black coaxial cable, 12-volt power cable, antenna (3.230 MHz frequency) and spare fuses.
7. Satellite Phone – Make sure battery is good and that it is activated.
8. 12 Volt battery - Make sure to charge battery; battery testers are available at the office (Battery must be transported in a case).
9. Solar panel - Check wires and connections.
10. ATV kit - A small tool kit.
11. Propane - Make sure propane tanks are full.
12. Stove oil - Use only #1 heating oil.
13. ATV gas - Take at least 3 containers of gas.
14. Firearm & cleaning kit - Shotguns, ammunition, and gun cases are available at the office; check with Steven Thomsen or Iris Caldentey. Know how to clean, load, and carry the firearm safely.
15. Emergency/ safety equipment - EPIRB, rescue light, and first aid kit.
16. Paper work - Can be obtained from Steven Thomsen, Switgard Duesterloh or Rob Baer.
17. Groceries - Purchase sufficient groceries for approximately two weeks, plus some extra quick meals in case supply flights are delayed. When selecting groceries consider the weight and bulk of your items.
18. Personal gear - Warm clothes, sleeping bag & pad, and books.
19. Sampling gear- Scale cards, write in the rain books, polarized glasses, gloves, waders and wading boots.

At the end of the field season, please make sure all equipment from your camp is put away properly and in the correct place. If you choose to return next season, this may again be your gear.

Table adapted from Caldentey (2008).

Table 2.—Weekly crew report.

To: Steve Thomsen

Date: 5/30/08

Kodiak Finfish Research Biologist

From: Crew leader
Saltery Weir

Subject: Saltery Weekly
Field Report

General Information

Fish Counts and Build up

Sampling Activities

Public Interactions

Anticipated Activities

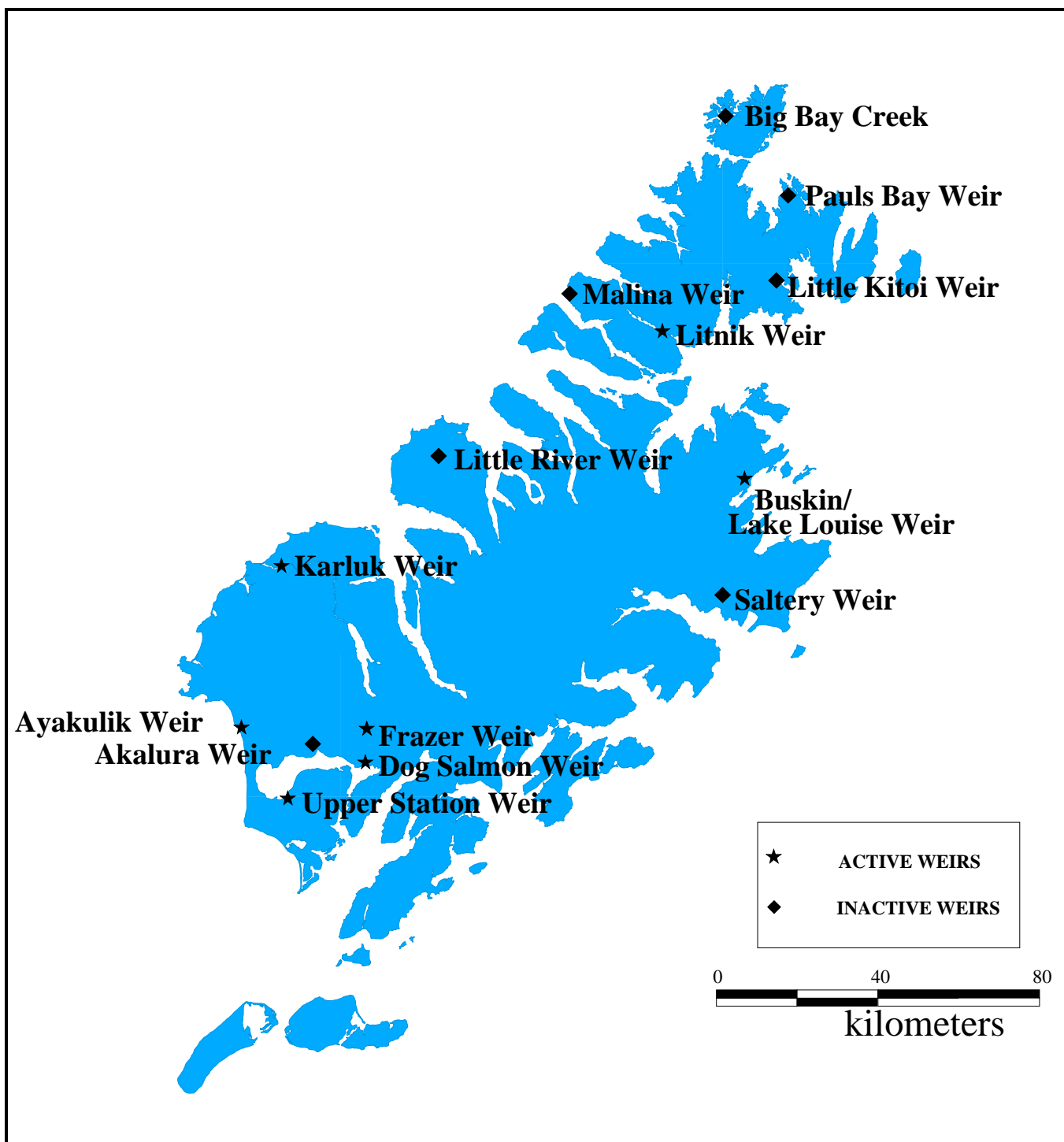


Figure taken from Caldentey (2008).

Figure 1.—Map depicting the Kodiak Management Area weir locations operated by ADF&G CFD in 2008.

Daily Physical Observations

Project Saltery

Year 2008

page of

DATE	TIME	TEMPERATURE °C		CLOUD COVER		VISIBILITY (mi)	WIND		GAUGE ¹ (cm)	COMMENTS (i.e., rain, drizzle, ect...)
		AIR	WATER	Percent (%)	Ceiling		Direction	Vel. (kts)		

Figure taken from ADG&G (2007).

Figure 2.—Daily physical observation form.

**ALASKA DEPARTMENT OF FISH AND GAME
KODIAK MANAGEMENT AREA
WEEKLY SALMON WEIR CAMP REPORT FOR YEAR: 2005**

Location: Ayakulik

Personnel: Chiles/Reid

Weekly Report no: 7

For Week Ending Saturday: July 7

Date	Daily Total Salmon Escapement						Daily Totals	Steelhead		Jack No.	Jack % Sockeye	Net Mark Sockeye	Reds Sampled	Dollys up	H ₂ O Level	H ₂ O Temp.	Weather		
	Sockeye	L. Sockeye	Chinook	Pink	Coho	Chum		Down	Up								Ceiling	Vis.	Wind Dir/Sp
Sun. D	296		56	0	0	0	352	0	0	20	6.8	4	0	12	13	7.5	2,000 solid	5	SE 15-20
7/1 C	213,789		6,211	0	0	0	220000	697	0	4,256	2.0	675		623			Rain		
Mon. D	26		100	0	0	0	126	0	0	0	0.0	1	80	36	13.5	7.5	1,000 Solid	3-5	E 10-15
7/2 C	213,815		6,311	0	0	0	220126	697	0	4,256	2.0	676		659			RDF		
Tue. D	569		29	0	0	0	598	0	0	102	17.9	15	0	50	13.5	7.5	500 Solid	1-2	NE 20-25
7/3 C	214,384		6,340	0	0	0	220724	697	0	4,358	2.0	691		709			RDF		
Wed. D	2,326		39	0	0	0	2365	0	0	156	6.7	30	80	106	14	7.5	CAVU		SW 5-10
7/4 C	216,710		6,379	0	0	0	223089	697	0	4,514	2.1	721		815					
Thur. D	781		212	0	0	0	993	0	0	68	8.7	24	0	26	14	8	CAVU		Calm
7/5 C	217,491		6,591	0	0	0	224082	697	0	4,582	2.1	745		841					
Fri. D	105		62	0	0	0	167	0	0	9	8.6	5	80	16	13.5	8	4,000	Unl.	W 15
7/6 C	217,596		6,653	0	0	0	224249	697	0	4,591	2.1	750		857					
Sat. D	265		106	0	0	0	371	0	0	18	6.8	9	0	93	13.5	8	4,000	Unl.	SW 15-25
7/7 C	217,861		6,759	0	0	0	224620	697	0	4,609	2.1	759		950					
Total for week	4,368		604				4,972			373		88	240	339					

Additional Comments: Bear and people problems, smolt migration, weir problems, estimated escapements, cabin repair, etc.

- 1-Jul Approximately 2,000 Sockeye in lagoon
- 2-Jul No additional build up in lagoon, small numbers of jumpers off mouth
- 3-Jul Found hole in Weir in the morning, Estimate of 200 Sockeye included in escapment counts
- 4-Jul Lots of rafters today, fishing is slow upriver
- 5-Jul Approximately 500 Sockeye in lagoon
- 6-Jul New sow with cubs trying to fish behind weir, respond well to yelling
- 7-Jul Lots of jumpers off the mouth, looks some pinks starting to jump as well

***Note** Daily sockeye jack counts must be included in the overall daily count

Figure taken from Caldentey (2007)

Figure 3.—Weekly weir camp reporting form.

**APPENDIX A. SATELLITE TELEPHONE AND DISPATCH
INSTRUCTIONS.**

Appendix A1.—Satellite telephone and dispatch instructions.

The following information serves as a Policy Statement regarding the allowable uses of ADF&G satellite phones and instructions on the proper method to successfully set up and operate the satellite phone system assigned to your camp.

These systems are not like standard telephones or cell phones, nor are they like a single side band or VHF radio. Communication is sent through the transmitter to low level satellites, then is beamed down to ground stations, either directly to another satellite phone system or to a switching station linked to standard telephone lines. As such, there is a much higher cost involved in operation than with standard telephone long distance or cell phone charges.

Under no circumstances may you use this satellite phone system for personal calls unless, for each event, you have obtained direct and explicit permission from your project supervisor. This does not mean that field crew leaders may grant permission for personal use of this phone. Only the project supervisor may give you such permission. Any deliberate misuse of this system, such as making unapproved, non-emergency, or personal calls, will result in disciplinary action, which may include suspension or discharge.

The primary purpose for having this satellite phone is for secure, reliable communications between remote field stations and ADF&G offices (Kodiak, Chignik, Cold Bay, Sand Point, or Port Moller), ADF&G research vessels (Resolution or K-Hi-C), Fish and Wildlife Protection vessels and offices, or other field camps that are similarly equipped. The secondary purpose is for your safety. With these phones you are capable of directly dialing emergency services at any time of the day or night. It is essential that these phone systems are maintained in good working order, are fully charged or hooked to sufficient power at all times, and remain free for official or emergency use.

Instructions

The portable sat phone unit must be charged with power. There is an internal battery pack, and a 12-volt adapter is available in order to hook the phone to a larger battery bank, that may in turn be recharged by generator or solar panels.

Turn the unit on using the power switch in the lower left corner. A green light, just above the switch, should come on indicating that the unit is sufficiently powered. If no light or a red light comes on, you will need to charge the unit, or attach it to your 12-volt battery bank via the appropriate connections.

The back, or top, of the briefcase-like unit is the antenna, and it must be oriented correctly in order to access the receiving satellite. The top of the case should be open and pointed in a general east-southeast direction. You must have a fairly clear line-of sight to the horizon in that direction; this unit will not work through walls or mountains. The angle of the antenna should be almost vertical; remember to lock the support arm that attaches the lid to the main body of the unit, along the right side.

This system has two means for calling; a telephone-like handset (for dial in or dial out phone calls), and a push-to-talk microphone (for 'dispatch', unit to unit, calls). All calls made with the handset are billed per minute of use, at an expensive rate. All calls on the 'AlaskaNet' dispatch system, using the microphone, are essentially free.

When first turned on, the handset and microphone should become active, with the display panels on the top of the phone handset and microphone lighting up (one LED panel, hopefully the one on the handset, should read sleep). The display will show, after a few moments, whether a connection has been established with the satellite, and how strong the signal is (ex. *B05 S 21*). Turn the unit slightly, and raise or lower the lid/antenna slightly until the highest possible signal strength is indicated (normally above 20 but will work down to 8). Lock the lid/antenna in place and do not turn the unit again, until your communications are finished. Once a strong signal is acquired push the "*" button for 2 seconds. Wait until there is a "beep" and the LCD screen displays '00:DN ??', then dial the number.

Appendix taken from ADF&G (2007).

-continued-

Alaska Dispatch System

Because all calls made on the dispatch system are free, this is the method of choice for using the satellite phone units. There are several ADF&G offices, many field camps, and two research vessels on the AlaskaNet dispatch system, as well as Fish and Wildlife Protection/State Troopers offices and vessels, plus many canneries, fishing vessels, and tenders. You should have received a 10-12 page directory with your phone; if not ask your project supervisor for a copy.

First, make sure the unit is turned on, and that there is sufficient power. Set the unit up so that the signal strength is at the maximum for your location. You should see the signal strength on the microphone display (ex. *B05 S 21*), and the handset display should read SLEEP. Once a strong signal is acquired push the “*” button for 2 seconds. Wait until there is a “beep”.

On the microphone display, below the signal strength, there should be a query, ‘00:DN ??’. This is asking you to ‘dial’ in the 4-digit dispatch number that you wish to call. After you have entered the 4-digit dispatch number of the unit you wish to contact, hold in the microphone key and a connection will be made with the satellite, which will then try to connect with the dispatch number you punched in. If a connection is made you will hear two beeps (“bird chirps”) and the microphone display will read SELF. While continuing to hold in the microphone key, call the station you wish to talk to. Use all the same formalities as when calling on a SSB radio. For example, say “Calling the ADF&G Kodiak Office, Calling the ADF&G Kodiak Office; this is Karluk Weir”. When you release the microphone key, the unit will beep again.

Be patient. It will take some time for the signal to go up to the satellite, down to the number you called. It may take the other party some time to get to the microphone and respond (this is especially true for calls to the ADF&G office; supervisors have to walk down to the radio room to respond). When they respond, their 4-digit dispatch number (DN) will show on the microphone display. This is a private conversation, unlike the previous dispatch service.

Just remember to be patient; wait until the other party stops speaking and you hear the unit beep (indicating that they are finished with this portion of their communication), the display should read SELF, and you may key microphone to talk. Then you must again wait for the other party to respond. If the other party is not there, they simply will not answer. If the satellite connection cannot be made, the display will read ‘Unable to Connect’ or ‘Not Available’.

LOCKING UP

Occasionally if someone hits the wrong buttons on the portable ST-151 model (the big clunky suitcase model) it could lock up the handset. To unlock the handset there is an unlock code which can be generic or specific to your phone. Turn on the phone and hit 0 0 0 0 (the generic code). If that doesn’t unlock the handset punch in FCN 8 2 (function, 8, 2). The phone should then give you an UNLOCK CODE message followed by 4 digits. Enter these 4 digits and it should unlock the handset. If this doesn’t work sometimes you can unlock your handset by punching FCN 8 2 followed by 0 0 0 0. One of these methods should unlock your handset.

PHONE SYSTEM

Do not use the handset to place calls unless absolutely necessary. All calls made with the handset are billed per minute of use, at an expensive rate. Calls should only be made to supervisors, either when radio or dispatch contact is not possible or when a confidential message needs to be relayed. Calls are made by dialing out, almost like a standard telephone. Punch in the area code and telephone number, then press send (button located in the upper right corner of the handset). Because there is a satellite relay, there will be a slight delay between when you speak and when the other party hears you, so be patient.

Appendix taken from ADF&G (2007).

-continued-

Note every call in a phone logbook. The system will show you the amount of time you've used on the call, on the LED panel. Note the number called, the date, approximate time, and the length of the call (minutes and seconds). When the call is completed, you must push the end button (top right corner of handset buttons), otherwise the system will remain active and you will be billed for the time (at almost a dollar a minute). Remember to press end.

If someone calls in to this unit, it will ring, like a standard telephone. Press the SEND button to start the conversation, but remember to press end to finish the call. ADF&G is billed for all calls made using the handset, both the calls you dial out and any calls dialed in.

IN CASE OF EMERGENCY:

If there is a medical emergency, or a real danger to life or health, immediately call the US CoastGuard Rescue Coordination Center at 800-478-5555. Be ready to tell them your name, exact location (latitude and longitude or nearby major landmark), and the exact nature of your emergency. They may question you extensively, so be prepared. There are emergency doctors on-call that can advise you. After the call is completed, immediately call your supervisor, at work or at home, and relay the details of your experience.

If there is an enforcement emergency, use the dispatch microphone to call the Kodiak office or the Alaska State Trooper, Bureau of Wildlife Enforcement (DN 6370).

Appendix taken from ADF&G (2007).

APPENDIX B. ELECTRICAL SYSTEM OPERATION MANUAL.

Appendix B1.—Solar panel and electrical system operation manual.

Each field camp utilizes an independent power system, consisting of 12-volt photovoltaic (PV) solar panels and a PV charge controller that charge a 12-volt battery bank for powering needed electrical components. Solar PV panels, when oriented towards the sun, will create direct current (DC) electricity. This DC electricity will effectively charge a bank of 12-volt batteries by providing a higher voltage than the battery voltage. In our common 12-volt systems, each solar PV panel will generate approximately 20 volts open circuit when directly oriented towards the sun. Any cloud cover or partial shading will reduce solar PV output considerably.

Both amperage and voltage numbers are displayed digitally on the PV charge controller. The PV charge controller regulates and limits the amount of electrical flow generated by the solar PV panels to the battery bank that is necessary to keep the 12-volt battery bank fully charged. Learn to understand what the amperage and voltage numbers represent and you will be in control of your power system.

Voltage is the most important reading you'll need to understand. A common misconception is that when a 12-volt battery meters 12.0 volts the battery is fully charged. The reality is that at 12.0 volts the battery is in a very discharged state. Many electronics may not work properly at such a low voltage. A 12-volt battery isn't fully charged until it reads at least 12.7 volts. The solar panels, batteries, and the loads (power being utilized or withdrawn from the system) in each system work in a dynamic equilibrium. The voltage rises and falls as power is deposited and withdrawn throughout the day and night. The actual reading that is important when assessing the state of charge of a battery is the "rest" voltage. This voltage is defined as the voltage reading when the batteries have been at "rest" for several hours. This means no loads on, and no solar power coming in. In practical terms this is the voltage early in the morning before any loads are on, and after the sun (solar energy) has been off the panels for a few hours.

If your solar array can't keep up with your essential loads then it will be necessary to add more solar PV panels, or run the gas generator to re-charge the batteries as needed. Most of the small gas generators in the field camps have 2 DC output lugs, one positive lug and one negative lug. These output lugs can be wired in parallel to the battery for recharging. Typically these chargers put out a maximum of 8.3 amps DC.

Batteries and connections are prone to corrosion in the marine environment. It is essential that battery terminals, all wiring and connections are clean and tight. A good cleaning with a wire brush and a check of all bolts and screws for proper tightness should be performed at the beginning and end of each field season. Most of the batteries that are now in use in our field camps are the sealed or gelled electrolyte type. These batteries don't require any maintenance other than cleaning. Some of the older electrolyte lead/acid batteries have removable plastic caps and require a periodic topping off with distilled water. Filtered rainwater can safely be used where no distilled water is available. Whenever the electrolyte level falls below the lead plates in the older style lead/acid batteries, it's time to add distilled water. Terminal and connections that are dressed with grease or LPS-3 will be far less prone to corrosion.

One problem inherent in the operation of these systems is that some of the charge controllers will create Radio Frequency (RF) noise or static on some radio frequencies when they are regulating voltages above 14.2-volts. In this case it may be necessary to throw the solar PV input switch to the off position temporarily while you use the radio or device that is experiencing the RF static. After you use the device just remember to put the input switch back in the on position to resume proper charging.

SEASONAL SHUTDOWN PROCEDURE

In most cases the solar panels are left in their permanent position and the charge controller remains in the charging mode. The essential thing to remember is that all loads need to be disconnected by throwing the "main load" switch or breaker to the fuse panel to the off position. This disconnects any electrical current flowing to the fuse panel. Remove any other loads that may be directly attached to the battery such as radios, clocks, DC chargers etc. Leave the "PV input" switch or breaker in the on position.

Batteries can freeze and burst if left in a discharged state in cold ambient temperatures. A fully charged battery will not freeze even at 60 degrees below zero. Make sure you don't leave the battery bank in a discharged state. If necessary run the generator in order to bring the batteries to a full state of charge before departing camp.

Appendix taken from Caldentey (2007).

-continued-

BATTERY STATE OF CHARGE REFERENCE GUIDE

Battery near full charge while charging.....	13.8 to 14.2 volts
Battery near full discharge while charging.....	12.3 to 13.2 volts
Battery fully charged with light load.....	12.4 to 12.7 volts
Battery fully charged with heavy load.....	11.8 to 12.5 volts
Rest voltage 100% charged.....	12.7 volts
Rest voltage 80% charged.....	12.5 volts
Rest voltage 60% charged.....	12.2 volts
Rest voltage 40% charged.....	11.9 volts
Rest voltage 20% charged.....	11.6 volts

Troubleshooting

The first step in troubleshooting is ensuring that you have the proper voltage to the device that's experiencing a problem. Most electronics in these systems are wired to a DC fuse panel. Next check the fuse panel for a blown fuse. If the fuse is ok then check to ensure all electrical connections are clean and tight. In addition some devices such as vhf and single sideband radios may also have inline fuses, check these as well. Blown fuses and poor connections are the most common culprit. If the solar PV panels aren't charging the 12-volt battery bank check the main solar input fuse to make sure it is good, and ensure that the breaker switch is in the on position. If the solar PV panels still don't put out proper voltage, check the wiring between the panels and the charge controller and check the connections on the rear of the solar PV panels. Make sure all connections are tight and clean. If corrosion is evident, use contact cleaner and or fine emery cloth or sand paper to gently clean connections.

Appendix taken from Caldentey (2007).

Spiridon Lake Sockeye Salmon Smolt and Commercial Fishery Monitoring Project Operational Plan, 2008

by

Switgard Duesterloh

and

Greg Watchers

April 2008

Alaska Department of Fish and Game

Division of Commercial Fisheries



Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative		fork length	FL
deciliter	dL	Code	AAC	mid-eye-to-fork	MEF
gram	g	all commonly accepted		mid-eye-to-tail-fork	METF
hectare	ha	abbreviations	e.g., Mr., Mrs., AM, PM, etc.	standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted			
liter	L	professional titles	e.g., Dr., Ph.D., R.N., etc.	Mathematics, statistics	
meter	m			<i>all standard mathematical</i>	
milliliter	mL	at	@	<i>signs, symbols and</i>	
millimeter	mm	compass directions:		<i>abbreviations</i>	
		east	E	alternate hypothesis	H _A
		north	N	base of natural logarithm	<i>e</i>
		south	S	catch per unit effort	CPUE
		west	W	coefficient of variation	CV
		copyright	©	common test statistics	(F, t, χ^2 , etc.)
		corporate suffixes:		confidence interval	CI
		Company	Co.	correlation coefficient	
		Corporation	Corp.	(multiple)	R
		Incorporated	Inc.	correlation coefficient	
		Limited	Ltd.	(simple)	r
		District of Columbia	D.C.	covariance	cov
		et alii (and others)	et al.	degree (angular)	°
		et cetera (and so forth)	etc.	degrees of freedom	df
		exempli gratia		expected value	<i>E</i>
		(for example)	e.g.	greater than	>
		Federal Information		greater than or equal to	≥
		Code	FIC	harvest per unit effort	HPUE
		id est (that is)	i.e.	less than	<
		latitude or longitude	lat. or long.	less than or equal to	≤
		monetary symbols		logarithm (natural)	ln
		(U.S.)	\$, ¢	logarithm (base 10)	log
		months (tables and		logarithm (specify base)	log ₂ , etc.
		figures): first three		minute (angular)	'
		letters	Jan,...,Dec	not significant	NS
		registered trademark	®	null hypothesis	H ₀
		trademark	™	percent	%
		United States		probability	P
		(adjective)	U.S.	probability of a type I error	
		United States of		(rejection of the null	
		America (noun)	USA	hypothesis when true)	α
		U.S.C.	United States	probability of a type II error	
			Code	(acceptance of the null	
		U.S. state	use two-letter	hypothesis when false)	β
			abbreviations	second (angular)	"
			(e.g., AK, WA)	standard deviation	SD
				standard error	SE
				variance	
				population	Var
				sample	var
Weights and measures (English)					
cubic feet per second	ft ³ /s				
foot	ft				
gallon	gal				
inch	in				
mile	mi				
nautical mile	nmi				
ounce	oz				
pound	lb				
quart	qt				
yard	yd				
Time and temperature					
day	d				
degrees Celsius	°C				
degrees Fahrenheit	°F				
degrees kelvin	K				
hour	h				
minute	min				
second	s				
Physics and chemistry					
all atomic symbols					
alternating current	AC				
ampere	A				
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity	pH				
(negative log of)					
parts per million	ppm				
parts per thousand	ppt,				
	‰				
volts	V				
watts	W				

SPIRIDON LAKE SOCKEYE SALMON SMOLT AND COMMERCIAL FISHERY MONITORING PROJECT OPERATIONAL PLAN, 2008

by

Switgard Duesterloh

and

Greg Watchers

Alaska Department of Fish and Game
211 Mission Road
Kodiak, Alaska 99615

April 2008

The Regional Information Report Series was established in 1987 and was redefined in 2006 to meet the Division of Commercial Fisheries regional need for publishing and archiving information such as project operational plans, area management plans, budgetary information, staff comments and opinions to Board of Fisheries proposals, interim or preliminary data and grant agency reports, special meeting or minor workshop results and other regional information not generally reported elsewhere. Reports in this series may contain raw data and preliminary results. Reports in this series receive varying degrees of regional, biometric, and editorial review; information in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author or the Division of Commercial Fisheries if in doubt of the level of review or preliminary nature of the data reported. Regional Information Reports are available through the Alaska State Library and on the Internet at: <http://www.sf.adfg.ak.us/statewide/divreports/html/intersearch.cfm>.

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ABSTRACT

The Alaska Department of Fish and Game (ADF&G) operates a sockeye salmon *Onchorhynchus nerka* smolt enumeration and biological sampling project at the outlet of Spiridon Lake (Telrod Creek). From early May to early July, a diversion weir and trapping system provide 100% capture of smolt. In addition, the ADF&G crew monitors a commercial salmon fishery at Telrod Cove, and collects adult sockeye salmon samples for age, length and sex composition. This operational plan provides information and instructions on how to set up and operate the trapping system and all procedures associated with the smolt and fishery monitoring projects.

Key words: smolt, smolt trap, smolt outmigration, sockeye salmon, *Onchorhynchus nerka*, Kodiak Island, Spiridon Lake, Telrod Cove

INTRODUCTION

Spiridon Lake (Figure 1) is located on the west side of Kodiak Island (approximately 74 km southwest of the city of Kodiak). It is the third largest lake on Kodiak Island and drains into Telrod Cove and Spiridon Bay by way of Telrod Creek. Spiridon Lake does not support anadromous salmon runs because of a series of impassable falls on Telrod Creek.

The Alaska Department of Fish and Game (ADF&G) and the Kodiak Regional Aquaculture Association (KRAA) have stocked Spiridon Lake with juvenile sockeye salmon *Oncorhynchus nerka* annually from 1990 through 2007 (Honnold 1997; Honnold and Byrne 2005; Honnold and Schrof 2001, Schrof and Byrne 2007). A pipeline was installed on the outlet of Spiridon Lake in 1991 to allow annual smolt emigrations to bypass a series of barrier falls.

Annual sockeye salmon smolt emigrations from Spiridon Lake are enumerated and sampled for age and size data to assess growth, juvenile survival and smolt to adult survival. These efforts include operation and maintenance of a bypass system (diversion weir, traps, dewatering tanks, and pipeline) in May and June (Figure 2).

Returning adult sockeye salmon are harvested in the commercial salmon fisheries within the Northwest Kodiak District with a large portion caught in the Spiridon Bay Special Harvest Area (SBSHA), located at Telrod Cove (Figure 1). From late June to August, the fishery in the SBSHA will be monitored. Monitoring duties include estimating the build-up of returning sockeye salmon, estimating and sampling the sockeye salmon harvest, and estimating the incidental harvest of chinook *O. tshawytscha*, chum *O. keta*, pink *O. gorbuscha*, and coho *O. kisutch* salmon.

This operational plan is a reference document for the Spiridon Lake field crew to use during the field season. Detailed instructions are provided for all routine tasks assigned to the field crew.

GOALS

The goals of the Spiridon Lake Sockeye Salmon Enhancement Project are to:

1. Evaluate the growth and survival of juvenile sockeye salmon stocked into Spiridon Lake,
2. Ensure that smolt survive when emigrating to the marine environment from Spiridon Lake,
3. Monitor the commercial fishery in the SBSHA and evaluate the magnitude and biological attributes of the adult sockeye salmon run to the SBSHA,
4. Comply with the monitoring requirements of the Spiridon Lake Management Plan in agreement with the Kodiak National Wildlife Refuge.

OBJECTIVES

The objectives include the following:

1. Prevent emigrating smolt from passing over the series of barrier falls to minimize injury and/or mortality,
2. Count the daily emigration of sockeye salmon smolt from Spiridon Lake,
3. Measure, weigh, and collect scales for aging the emigrating sockeye salmon smolt,
4. Estimate the daily commercial salmon harvest in the SBSHA (at Telrod Cove) by species,
5. Estimate the pink and sockeye salmon escapements into Telrod Creek.

PRIMARY TASKS

1. Install and operate a smolt trapping and pipeline system, and maintain it throughout the sockeye salmon smolt emigration.
2. Estimate the daily emigration of sockeye salmon smolt using individual and timed counts.
3. Sample 40 sockeye salmon smolt per day, five days per week, for scales, weight, and length data.
4. Collect daily data of air and water temperature, the stream depth, and weather observations.
5. Conduct foot surveys at the beginning and end of the fishery monitoring portion of the project to estimate the number of adult salmon escaping into Telrod Creek (End of June and first week in August).
6. Estimate and report the SBSHA salmon build-up and vessel activity, and estimate salmon harvest by species and day throughout the fishery.
7. Sample 80 adult sockeye salmon, every other day for three days per week (240/week; 1,680 total), for age, sex, and length data from the commercial fishery at SBSHA (Telrod Cove). During the peak return of sockeye salmon to the SBSHA (July 1-30), sampling should be intensified to collect an additional 80 ALS samples per week.

SUPERVISION

Project Biologists: Switgard Duesterloh and Greg Watchers

Field Crew: Crew leader – Greg Watchers

Crew member – Celeste Block

The Project Biologists will oversee the project and provide logistical and technical support. The crew leader will schedule daily tasks and oversee field operations and safety during the project. The crewmembers will assist the crew leader in all assigned tasks and field operations.

PROCEDURES

SMOLT BYPASS SYSTEM INSTALLATION

The following sequence is used during the installation of the smolt bypass system:

Installation of the Traps and Support Structures

1. Install two Canadian fan traps in Telrod Creek (mid channel) where indicated by permanent bank markers.
2. Anchor the traps with cable to turnbuckles permanently attached to the previously anchored duckbills on the stream bank.
3. Use 3.0 to 3.2-meter (10 - 12 foot) sections of 5.1-centimeter (two-inch) diameter pipe joined by NU-RAIL fittings as a frame to secure and support the traps.
4. Use come-a-longs, secured to the overhead steel pipe cross members, to elevate the downstream ends of the traps.
5. Secure additional cable supports from the traps to the overhead pipes.

Attachment of De-Watering Tanks to the Traps

1. Place de-watering tanks downstream of each trap and secure the tanks by cable to previously positioned duckbill anchors on the stream banks.
2. Connect each trap to the de-watering tanks with sections of aluminum trough; secure the upstream ends of the troughs with threaded rod inserted through previously drilled holes.
3. Use rubber and foam pipe insulation material to ensure a tight fit between the ends of troughs and the tanks and traps.

Diversion Weir Installation

1. Construct a diversion weir upstream of the traps using a frame made from 1.6-meter (5-foot; legs), and 2.8-meter (8-foot; cross members), 5.1-centimeter (two-inch) diameter pipe and NU-RAIL fittings.
2. Attach 1.3 by 2.5-meter (4 by 8-feet) sheets of aluminum perforated plate to the frame starting at the traps and working upstream.
3. The first sheet of perforated plate is secured to the side of each trap with screws where the plate and the side of the trap are joined. The trap and perforated plate should rest on the streambed; continue placing sheets of perforated plate on the frame with each upstream piece overlapping the previous downstream piece by approximately six inches and securing the plates together with bailing wire.
4. Install a “dam” where the weir meets the stream banks to make the weir “fish tight” near shore; use boards, sandbags and Lortex (plastic sheeting) for the dam.
5. Place a 1.5-meter (~2 feet) wide piece of Lortex along the entire base of each side of the weir to further seal the weir: place half of the width of sheeting on the substrate and half of the width on the base of the weir. Place sandbags along the base of the weir to hold the sheeting in place.
6. Also place Lortex over the seams of the perforated plate and any other areas with protruding edges that may be hazardous to smolt.
7. Install a “V” type center de-watering plate between the traps to direct additional flow toward the traps, which eliminates any “pooling” effect in front of the traps and reduces smolt pinning. Use bailing wire to secure the “V” to the rest of the trap.

8. Once the “V” is installed to the traps, line the inside walls and bottom of each trap with a blue tarp and/or Lortex as needed to minimize smolt pinning against the perforated plate and increase water velocity into the de-watering tanks.

Connecting the Pipeline to the De-Watering tanks

1. Connect a pipeline section with camlock fitting end to each of the downstream ends of the de-watering tanks.
2. Make sure the open-ended pipeline sections are resting on the lip of the counting tank.
3. The water level in the counting tank is adjusted with the standpipe located on the downstream end of the tank. A come-along attached to the cod end of the trap is used to adjust the volume of water flowing into the de-watering tanks.

BYPASS SYSTEM MONITORING

1. The traps will be operated to maintain efficiency and minimize smolt mortality. This requires frequent monitoring and maintenance since significant mortality can occur in a short period of time. Fish tend to hold in the tanks and pipeline during the day and any loss of flow through the system may result in mortality. Some mortality may also occur due to high water pressure, which results in smolt being pinned on perforated plate. Plastic sheeting may need to be added to the perforated plates to reduce pinning.
2. An accurate account of mortality will be recorded on the *Spiridon Smolt Daily Reporting Form* (Figure 3).

SMOLT EMIGRATION ESTIMATES (TIMED COUNTS)

Daily estimates of the sockeye salmon smolt emigration from Spiridon Lake will be made using timed counts, every half-hour (30 minutes) from 2300 hours through 0500 hours. A 24-hour period from noon to noon, identified by the calendar date corresponding to the first noon, is a single enumeration day. Half-hour counts are from 1.0 minutes (minimum) to 8.0 minutes (maximum) in duration. The duration is dependent on the rate of smolt movement (e.g., the minimum time is used during large migrations and the maximum time during slower smolt movements).

1. At the beginning of a count, the gate on the counting trough is swung away from the operator, allowing smolt to drop into the counting basket submerged in the tank; use a stop-watch to time the collection of smolt in the counting basket.
2. At the end of the count, the gate is moved towards the operator, allowing smolt to bypass the counting basket. Record the count-time and enumerate the smolt from the counting basket, then release them down the pipeline.
3. Use the same procedures (number 1 and 2 above), if large smolt movements occur during the day (0500 to 2300 hours).
4. At the end of daily counting shift (~0500 hours), secure the gate in the open position, allowing smolt to fall into the counting basket. Cover the trough and catch basket with perforated plate to prevent smolt from jumping on to the floor.
5. Check the catch basket first thing in the morning (0900 hours); individually enumerate and release the smolt collected. Repeat this step just prior to noon when the counting day ends.

6. If smolt are spilling from the pipes at a slow rate, all smolt should be collected in the counting basket and counted individually.

SMOLT ENUMERATION DATA MANAGEMENT

1. Estimate the daily smolt emigration by calculating timed count estimates for each half-hour (30 minutes) counting period as follows: multiply the number of smolt counted per time period (1 to 8 minutes) by 30 minutes divided by the time period (30/1 to 30/8).
2. Record timed or individual counts (include “individual count” in “Remarks” section), migration estimates, and remarks on the *Spiridon Smolt Daily Reporting Form* (Figure 3).
3. Summarize daily trapping data on the *Spiridon Sockeye Salmon Smolt Summary Reporting Form* (Figure 4).

AGE, WEIGHT AND LENGTH SAMPLING

Forty (40) sockeye salmon smolt will be sampled each day, five days per week, for age, weight, and length (AWL) data (Appendix A1). Smolt will be collected while they are counted as described in the previous section of this operation plan; they are selected without known bias from each half hour timed count and placed into a “sampling container” submerged in the counting tank. The smolt from each timed count will be held in the container until sampled. AWL data are typically collected from the smolt after the last count of the enumeration day. Note: the 24-hour enumeration day is equivalent to the sampling day. Proper AWL sampling methods will be demonstrated to each crewmember by the project biologist. The general procedures are as follows:

1. Prepare all equipment prior to sampling, including: a digital scale, a small dipnet, two buckets with aerators, a basin for anesthetizing the smolt, thermometer, Tricaine Methanesulfonate (MS-222), baking soda, latex gloves, slide holder, labeled slides, scalpel, dissecting probe, measuring board, and a rite-in-the-rain logbook.
2. Anesthetize the smolt with MS-222 mixed in water. The project biologist will demonstrate the proper method of anesthetizing smolt with MS-222. A copy of the Material Safety Data Sheet for MS-222 is located on site and should be read by each crew member. Latex gloves will be worn to prevent direct exposure to the MS-222.
3. Measure each smolt from the tip of the snout to the tail fork. Record the smolt length, to the nearest millimeter in the rite-in-the-rain logbook (Appendix A4).
4. Use a knife or scalpel to remove 5-10 scales from the preferred area (Appendix A4).
5. Mount the scales on a glass slide with five fish per slide (Appendix A5).
6. Label the left portion of each slide with the AWL number, location, species, date, and fish number.
7. Remove excess water from the smolt using a moist paper towel as a blotter prior to placing the smolt on the scale to obtain a weight. Record individual smolt weights in the rite-in-the-rain logbook to the nearest 0.1-gram.

AGE, WEIGHT, AND LENGTH DATA MANAGEMENT

1. Transcribe the AWL data to the AWL form as described in Appendix A3.

2. Record up to 40 samples per AWL form.
3. Record names of personnel collecting the data at the top of each AWL form.

PHYSICAL OBSERVATION DATA

Water and air temperatures, stream height, percent cloud cover, wind direction and velocity, and precipitation data will be collected at the smolt site at approximately 1100 and 2300 hours each day. Install a stream gauge (meter stick) downstream of the smolt diversion weir once the trap/bypass system is operational (preferably prior to the smolt emigration).

1. Use hand held thermometers to record water and air temperatures (°C).
2. Measure stream height at the stream gauge (cm).
3. Estimate percent cloud cover, wind direction, and wind velocity by direct observation.
4. Record information on the *Daily Physical Observations Form* (Figure 5).

FISHERY MONITORING

The commercial salmon fishery in the SBSHA (located at Telrod Cove) will be monitored prior to the initial opening until the closure (Figure 1).

1. Estimate the catch by species by interviewing vessel skippers and tender operators. Total catch data will be obtained through the ADF&G fish ticket database.
2. Record vessel names, and estimated catch by species during each day's fishery on the *Spiridon Bay Special Harvest Area (Telrod Cove) Fishery Monitoring Reporting Form* (Figure 6).

HARVEST SAMPLING

A portion of the commercial sockeye salmon catch from the SBSHA will be sampled for age, sex, and length data. The minimum sampling goal of 1,680 fish total (about 280 fish weekly) will be necessary to assess the age composition of the SBSHA run. During the peak of the run, when commercial catches increase dramatically, the crew will increase sampling efforts and collect an additional 80 ALS samples per week. The crew leader will notify the project biologist of the increased harvests and discuss whether a change in the sample size is necessary.

In addition to the SBSHA samples, sockeye salmon scale samples may be requested to be collected from the catches at the Chief Cove, Hook Point, or Thistle Rock set net sites (Figure 1). These samples will be necessary if scale sampling goals at Larsen Bay are not achieved, and the crew will be directed by the project biologist to collect these extra samples. It always is at the discretion of the crew to decide if the weather permits the sampling trip.

Adult salmon sampling methods are described in Appendix B. If further training in adult salmon sampling techniques is necessary, an experienced sampler will demonstrate the proper techniques in the field.

STREAM SURVEYS

Foot surveys will be conducted in lower Telrod Creek (to first barrier falls), one at the beginning of commercial fishery (~ 25 June) and one towards the end of the fishery (late July to early August).

1. Enumerate the number of live and dead adult salmon by species.
2. Enumerate jack sockeye salmon separately from the overall sockeye salmon observed.
3. Record survey data on the *Telrod Creek Escapement Surveys Reporting Form* (Figure 7).

SAFETY

Review specific sections of the ADF&G Safety standard operating procedures (SOP) manual that apply to the situations possibly encountered at your job site, prior to field deployment. Focus on the following sections of the manual: Policy/Standards, Building Safety, Field Camp Safety, Aircraft/Passenger Safety, Emergency/Survival Equipment Required in Aircraft, Boating Safety, Vehicle Safety, Small Tool Handling, Firearm/Bear Safety. After reviewing the above sections in the manual, sign the Employee Safety SOP verification form that acknowledges that you have read the material.

All employees are required to attend and pass a certified CPR/First Aid training course prior to field deployment. Each employee is required to read the ADF&G Safety standard operating procedures and perform his/her duties in the field in a safe manner (e.g., wearing a PFD whenever riding in or operating a skiff or vessel). Crew leaders are responsible for the overall safe operation of the field camp and ensuring that all the necessary safety equipment and materials are available to field technicians.

Both of the Spiridon field camps are located in bear country. Trash produced at these camps will be handled in a responsible manner. All organic matter will be disposed of in Telrod Creek, just upstream of the first waterfall. All burnable materials will be disposed of in the burn barrel located behind the cabin. When burning, the barrel will be closely monitored to prevent grass fires. All inorganic or unburnable materials will be shipped to town in doubled trash bags on the next flight.

COMMUNICATION SCHEDULES AND AIR CHARTERS

During the smolt portion of the project, a satellite phone will be used for daily communications between field personnel and the project biologists stationed at the Kodiak ADF&G office.

Daily communications will be from 1300 to 1315 hours Monday through Friday and at 1900 hours on Saturday and Sunday.

Be prepared to provide the project biologists with the following information during each daily contact:

1. General weather conditions (e.g., “1,000 foot broken ceiling, visibility 5 miles, winds are calm, and its raining”).
2. Smolt Data
 - Daily and cumulative smolt counts
 - Daily average smolt weight and length
 - Stream height (cm) at the stream gauge and water temperature (°C)
 - Other pertinent information regarding the bypass system, smolt movements, etc.
3. Fishery Monitoring Data

- Daily and cumulative catch per species
- Daily and cumulative number of samples collected
- Other information as requested

4. Logistics

- Grocery and supply needs and approximate delivery dates (evening or weekend radio contact)
- Expected time of arrival of returning air charters and a description of items (e.g., equipment, data forms, empty fuel containers) returning to Kodiak on the flight.

Instructions on the operation and transmission on the satellite phone are provided in Appendix C.

Once the field personnel move to the SBSHA monitoring camp located at Telrod Cove, an Iridium satellite phone will be used for daily communications between field personnel and the Kodiak ADF&G office. Instructions for operating the phone will be included with the phone. Please keep in mind that phone use is restricted to ADF&G related activities and emergency contact. The phones are not for personal use.

Daily contact Monday through Friday will occur between 1300 and 1315 hours. On Saturday and Sunday, the contact will occur at 1900 hours. Be prepared to provide the project biologist general weather conditions, fishery monitoring data, and other information as requested. Contact during the specified times is required, unless other arrangements are made.

Field personnel can contact the Kodiak ADF&G office from 0800 to 1630 hours, if needed. **BE AWARE OF THE EMERGENCY CONTACT PROCEDURES POSTED WITH EACH SATELLITE PHONE AND MAKE SURE YOU KNOW THE LONGITUDE AND LATITUDE COORDINATES OF YOUR CAMP (Spiridon cabin 57 40' 36.55"N, 153° 39'3.10W; Telrod Cove 57 39'07.48", 153° 37'46.36"W; US Coast Guard emergency 800-478-5555)**

EQUIPMENT STORAGE AND INVENTORY

Upon completion of the project, complete a thorough inventory of all project equipment and provide a list of additional items needed for the next season. Note the final location of each inventoried item (e.g., at Spiridon, warehouse bin, etc). Return the completed inventory to the project biologist(s).

TIMESHEETS

Forward timesheets to the KODIAK OFFICE by the 15th and last day of each month! Be prepared to send timesheets into town when flights may stop at your field site. If flights don't coincide directly with time sheet periods you can estimate work times for the remaining days, and confirm or change them per radio schedule on the day that ends the pay period. To ensure that timesheets are properly filled out, instructions are in Appendix D1. An example of a properly filled out timesheet is in Appendix D2. Remember to always use the military time format! Plan work activities to be completed in a 7.5-hour day or less, and a total of 37.5 hours per week; work overtime only if pre-authorized by the project biologist, or if an unforeseen situation arises that jeopardizes the project operation and needs to be attended to immediately.

When project activities make scheduling of work times difficult, such as during trap installation, take a break at least every 4 hours.

REPORTING

The crew leader is responsible for the accuracy, completeness, and neatness of the collected data. The managing and reporting of the accurate data in an organized, understandable manner by crew leaders and crewmembers is essential to the success of the project.

Crew leaders are responsible for reporting the following:

1. Daily work activities and biological data
 - Complete data forms and a field journal of daily events using a no. 2 pencil.
 - Write in "rite-in-the-rain" field logbooks when collecting data in inclement weather and then transfer data on to data forms in a sheltered area (sampling shed and/or cabin).
2. Summarize weekly work activities and biological data collected in a one-page weekly report of project activities following the format found in Appendix E.

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FIGURES

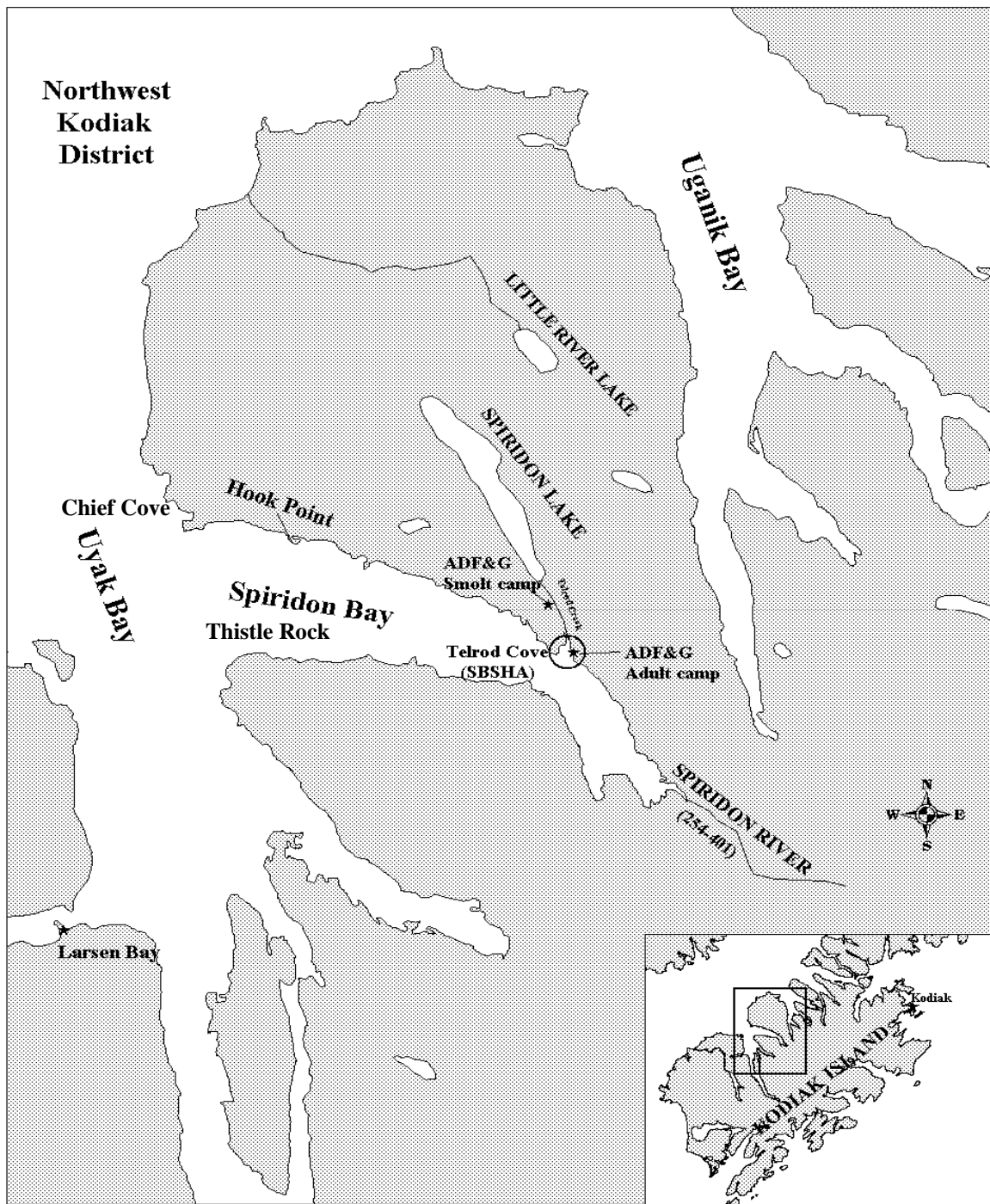


Figure 1.—Locations of the ADF&G smolt and adult salmon field camps at Spiridon Lake, and Telrod Cove, on Kodiak Island.

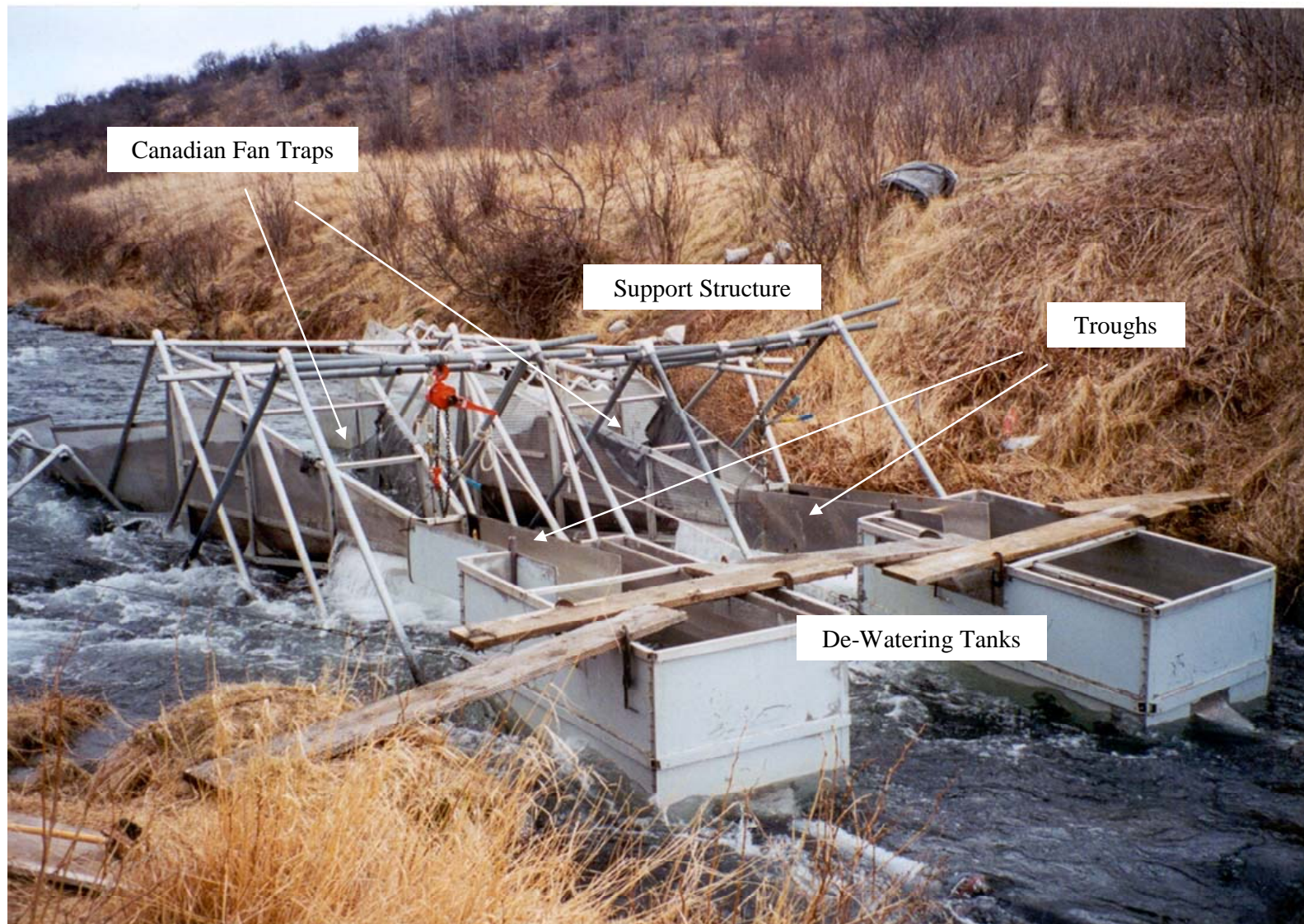


Figure 2.—Canadian fan traps, support structure, troughs, and de-watering tanks used in the Spiridon Lake smolt bypass system.

SPIRIDON SMOLT DAILY REPORTING FORM

Date: 5/10/2003

EXAMPLE

Counting		Multiple (30 Min. /Time)	Live		Dead		Total Estimate Live and Dead	Remarks
Period (Military hrs)	Time (Min:Sec)		Count	Count x Multiple	Count	Count x Multiple		
2300-2330			352		2		354	hand count
2330-0000	8:00	3.75	653	2,449	3	11	2,460	
0000-0030	8:00	3.75	988	3,705	0	0	3,705	
0030-0100	6:00	5.00	875	4,375	4	20	4,395	
0100-0130	2:00	15.00	888	13,320	3	45	13,365	
0130-0200	1:00	30.00	900	27,000	0	0	27,000	
0200-0230	1:00	30.00	955	28,650	0	0	28,650	
0230-0300	3:00	10.00	1,104	11,040	1	10	11,050	
0300-0330	8:00	3.75	777	2,914	0	0	2,914	
0330-0400	8:00	3.75	479	1,796	0	0	1,796	
0400-0430			401		7		408	hand count
0430-0500			345		4		349	hand count
0500-0700			1,678		24		1,702	hand count
0700-12:00			99		0		99	hand count
Totals:			Timed Live:	95,249	Timed Dead:	86	Timed Live&Dead:	95,335
			Other Live:	2,875	Other Dead:	37	Other Live&Dead:	2,912
			Total Live:	98,124	Total Dead:	123	Grand Total:	98,247

Figure 3.—An example of a Spiridon Lake sockeye salmon smolt daily reporting form.

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Figure 4.—An example of a Spiridon Lake sockeye salmon smolt summary reporting form.

DAILY PHYSICAL OBSERVATIONS FORM

PROJECT/ SUB-PROJECT: _____

YEAR _____

page _____ of _____

DATE	TIME	SITE ¹	TEMPERATURE (C)		CLOUD COVER		VISIBILITY (mi)	WIND		GAUGE HEIGHT (cm)	COMMENTS (i.e., rain, drizzle, etc...)
			Air	Water	Percent (%)	Ceiling		Direction	Vel. (kts)		

¹ Weir Site = W; Smolt Site = S**Figure 5.**—An example of the Spiridon Lake daily physical observations form.

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Figure 6.—An example of the Spiridon Bay Special Harvest Area (Telrod Cove) fishery monitoring reporting form.

Figure 6.—An example of the Spiridon Bay Special Harvest Area (Telrod Cove) fishery monitoring reporting form.

Telrod Creek Escapement Surveys Reporting Form

PAGE _____ OF _____

[illegible]

Figure 7.—An example of the Telrod Creek escapement survey reporting form.

APPENDIX A. SMOLT AGE-WEIGHT-LENGTH (AWL) SAMPLING MATERIALS AND METHODS

Appendix A1.—Smolt age-weight-length (AWL) sampling materials and methods.

Annually, outmigrating salmon smolt are sampled for age (scales), weight, and length, by field crews throughout the Westward Region. These data are essential for sound management of the State's salmon resources.

To be useful, data must be recorded on the age, weight, length (AWL) optical scanning (opscan) forms neatly and accurately. In addition, scale samples must be collected and mounted properly to ensure accurate age determination. The following procedures are to be strictly adhered to when sampling juvenile salmon for age, weight, and length.

Complete each section on the left side of the AWL form using a No.2 pencil and darken the corresponding circles as shown in the figures. Make every effort to darken the entire circle as the optical scanner, which reads and records the data from the AWL forms, may not recognize partially filled circles. Be sure to transfer the litho code, located in the left margin on the front side of the AWL form to the back side of the form by darkening the appropriate circles (see Appendix A3.).

Label only one form at a time to avoid a "carbon paper effect" resulting in stray marks. Special care should be used to ensure that stray marks do not occur on either side of the AWL form. Stray marks and scuffed AWL forms can severely hamper scanning. The AWL forms should be treated carefully; the scanner in the Kodiak office cannot read damaged forms. The forms should not be stapled, bent, paper-clipped or folded. Specific instructions for completing AWL forms are listed in Appendix X2 and an example of an AWL form filled out for smolt sampled can be found in Appendix A3.

All juvenile salmon AWL data will be recorded in a field notebook dedicated to smolt sampling. These data will then be transferred from the field notebook to the AWL forms. Each species will have its own AWL sample number series that runs sequentially throughout the season. Up to 40 individual fish per smolt day may be included in one AWL sample. If more than 40 fish are sampled in a single smolt day, then multiple AWL numbers will be used on that day. For example, if 70 sockeye salmon smolt are sampled in a single day (day 1), the AWL numbers will be AWL #001 (fish 1-40; 8 slides) and AWL #002 (fish 1-30; 6 slides). The next day will start with AWL #003. Each day's sample will start with a new AWL number.

Smolt will be sampled as soon as possible after they are captured. The smolt will be transported in clean, 5-gallon buckets to the sampling area. An additional bucket of water will be used as a recovery bucket. Buckets containing smolt will be filled with fresh, clean water and aerated. The buckets will be covered when possible to avoid stress on the fish.

Tricane Methanesulfate (MS-222) will be used to anesthetize the smolt; latex gloves will be worn to prevent direct exposure to the anesthetic. The this chemical will be administered by experienced personnel. A small amount (approximately 1 g) of MS-222 and a small amount of baking soda will be dissolved in approximately 2 L of cold water. The amount of anesthetic used will vary depending on the water temperature, freshness of the chemical, and size of the smolt. A few smolt will be placed in the anesthetic solution until subdued to a point where they can no longer flex their axial musculature but can still ventilate their gills. The concentration of the solution should be such that it immobilizes the fish in 2-3 minutes. After the fish are anesthetized, it is important to sample them quickly and place them in a recovery container to prevent mortality. No more than 80 smolt will be anesthetized with one batch of solution.

After the smolt have been immobilized, excess water will be gently removed from the fish using a paper towel or a wet sponge as a blotter. Place the fish on its right side to sample the left side. Measure smolt length, to the nearest mm, from tip-of-snout to tail fork (Appendix A4). Record length by blackening the appropriate column circles on the front side of the AWL form. When collecting length data, take care to ensure that each length corresponds to the appropriate scale smear mounted on the slide, as length-at-age is evaluated for each sample. Weigh each smolt to the nearest 0.1 g, and record the weight by blackening the appropriate column circles on the back side of the AWL form.

-continued-

On salmon species, the preferred scale is located where a straight line between the posterior insertion of the dorsal fin and the anterior insertion of the anal fin crosses the second scale row dorsal to the lateral line. In smolt, the area directly around this scale is considered the preferred area (Appendix A4). If scales are not present in this area then scales should be taken from the secondary location, which is the same area on the right side of the fish. A scalpel will be used to remove 5-10 scales from the preferred area. These scales will be mounted on a glass slide using a probe to position the scales. Scales from five fish will be mounted on each slide. The scalpel will be wiped clean of scales and slime between each fish. A diagram of a slide with scales mounted correctly is located in Appendix A5.

The left portion of each slide will be labeled with AWL number, sample location, species, date, and inclusive fish numbers. A diagram of a properly labeled slide is located in Appendix A5. After sampling, fish will be held in a recovery container until they are swimming normally and then released downstream of the trapping location. When the slides are completed, return them to the box in order by AWL # and fish #. Label the slide box on top with the information listed in Appendix A5.

Appendix A2.—Procedure for recording salmon smolt age-weight-length data on AWL forms.

Smolt length and weight will be recorded on AWL forms (Appendix A4.). Using a No.2 pencil, complete each section of the left side of the AWL and darken the corresponding blocks.

Fill out each of the following:

Description

Record the following: species, location, year and samplers names (e.g., sockeye smolt, Frazer fish pass, 2003, Sagalkin, Schrof).

Card

The AWL forms and corresponding slides are numbered sequentially by date throughout the season starting with 001. A new, consecutively numbered AWL form is used each day even if the previous AWL form is not full. There may be a minimum of one fish and a maximum of 40 fish (8 slides) per AWL form.

Species

Refer to the reverse side of the AWL form for the correct one digit code (e.g., sockeye = 2).

Day, Month, Year

Use appropriate digits for the date the fish are sampled.

District

List the district in which the fish were sampled. Consult your area statistical map or project leader for the appropriate district (**The Spiridon Lake district is 254**).

Subdistrict (Section)

List the subdistrict in which the fish were sampled. Consult your area statistical map or project leader for the appropriate subdistrict (**The Spiridon Lake subdistrict is 40**).

Stream

List the stream in which the fish were sampled. Consult your area statistical map or project leader for the appropriate stream number (**The stream number for Telrod Creek is 403**).

Location

Leave blank

Period

List the period (sample week) in which the fish were sampled (Appendix A6.).

Project and Gear

Refer to the reverse side of the AWL form for the correct code. For example, smolt samples collected in a trap would have a project code of 8 and a gear code of 00.

Mesh

Leave blank unless specifically instructed by supervisor to do otherwise.

Type of length measurement

Refer to the reverse side of the AWL form for the correct code (e.g., tip of snout to tail fork = 2).

-continued-

Number of scales per fish

Fill in the number of scales (smears) collected per fish. For smolt, one scale smear per fish is collected.

of cards

of cards always = 1 (each AWL form is individually numbered).

If possible, keep the AWL forms in numerical order throughout the season and keep all forms flat, dry, and clean. Remember, when sampling smolt, weight data is recorded on the back side of the AWL form and the litho code, located in the left margin on the front side of the AWL form must be transferred to the back side of the form (see Appendix A3). The litho code is the number unique to each AWL form and copying the litho code from the front to the back of the form indicates weight data was transcribed on the back of the form for the Optical scanning machine to read. Fish slime and water curling may cause data to be misinterpreted by the optical scanning machine. **It is the responsibility of the crew leader to make sure that all forms are carefully edited before returning them to their supervisor.**

Appendix A3.—Example of an AWL form filled out for smolt sampled. *Note:* Project code should be 8 not 4.

DESCRIPTION: *Pentucky/Thomas 1999*
Sockeye Smolt/Hidden Creek/DipNet

ADF&G ADULT SALMON AGE-LENGTH FORM VERSION 2.1 *TAG*

CARD: 001

SPECIES: 2

DAY: 04

MONTH: 06

YEAR: 99

DISTRICT: 251

SUBDISTRICT: 40

STREAM: 406

LOCATION:

PERIOD: 23

PROJECT: 4

GEAR: 13

MESH:

TYPE OF LENGTH MEASUREMENT

NUMBER SCALES/FISH

OF CARDS: 1

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DO NOT WRITE IN THIS MARGIN

DO NOT MARK IN THIS MARGIN

TRANSFER RESPONSES EXACTLY AS PRINTED ON FRONT TO THIS CARD

1-Chinook (king)
2-Sockeye (red)
3-Coho (silver)
4-Pink (humpy)
5-Chum (dog)

PROJECT

1-Commercial catch
2-Subsistence catch
3-Escapement (lower, upper, sear, etc.)
4-Escapement - spawning grounds
5-Tail fishing
6-Sport catch (marine)
7-Sport catch (freshwater)

GEAR TYPE

8-Trap
9-Purse seine
10-Beach seine
11-Handpiked
12-Dip net
13-Sat gillnet
14-18 Unassigned
15-Trawl
16-Long line
17-Shoots
18-Other trawl
19-Veip
20-Fishwheel
21-8-99 Unassigned
22-Poth
23-Sport hook and line

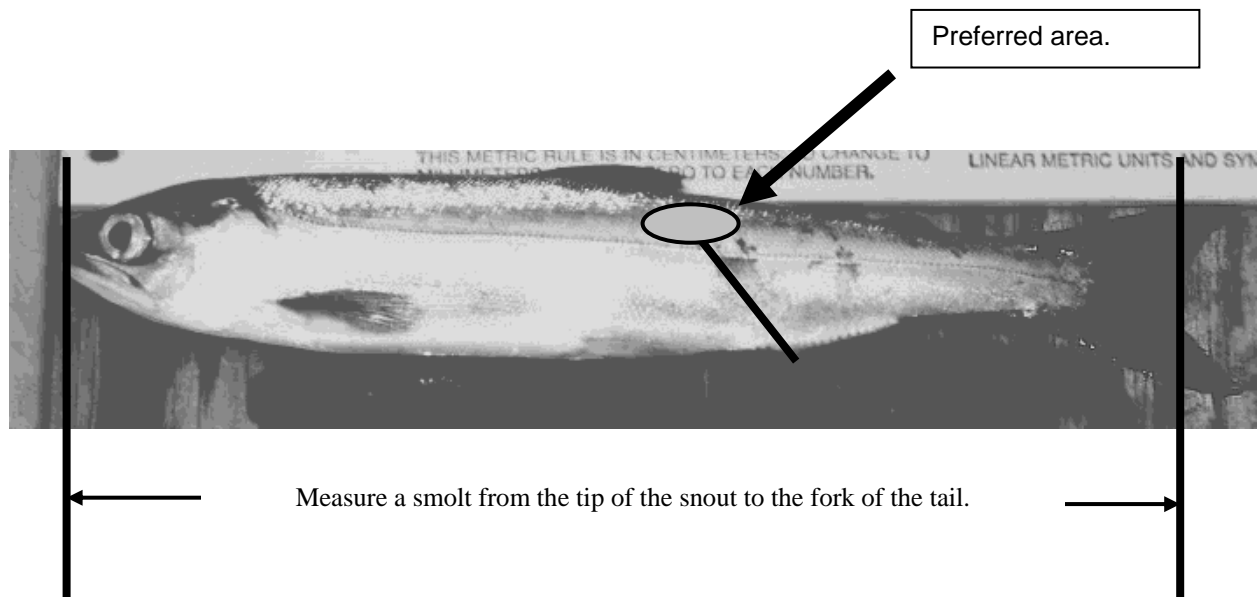
LENGTH TYPE

1-Top of snout to fork of tail
2-Mid-eye to fork of tail
3-Pont orbit to fork of tail
4-Mid-eye to hypural plate
5-Pont orbit to hypural plate
6-Unassigned

AGE ERROR CODES

1-Death
2-Inverted
3-Regenerated
4-Straggle
5-Missing
6-Unsorted
7-Wrong species
8-Not preferred

Appendix A4.—Photo of a smolt with the preferred area highlighted.



Appendix A5.—An example of 2 correctly labeled smolt slides. This represents fish 1 through 10 from a sample collected on 5/11/00.

AWL 001 Sockeye Bear Lake 5/11/00 Fish 1 - 5	1	•	•	•	•	5
	•	•	•	•	•	•
	•	•	•	•	•	•
	•	•	•	•	•	•
	•	•	•	•	•	•
	•	•	•	•	•	•
	•	•	•	•	•	•

AWL 001 Sockeye Bear Lake 5/11/00 Fish 6-10	6	•	•	•	•	10
	•	•	•	•	•	•
	•	•	•	•	•	•
	•	•	•	•	•	•
	•	•	•	•	•	•
	•	•	•	•	•	•
	•	•	•	•	•	•

When the slides are completed, return them to the box in order by AWL # and fish #, and label the slide box on top with the following information:

Location: Bear Lake

AWL Number: AWL 001-003

Beginning and end dates: 6/12-7/13/00

Sockeye Salmon Smolt

Appendix A6.—Sampling weeks and associated calendar dates.

Week	Calendar Dates	Week	Calendar Dates
1	01-Jan to 07-Jan	28	09-Jul to 15-Jul
2	08-Jan to 14-Jan	29	16-Jul to 22-Jul
3	15-Jan to 21-Jan	30	23-Jul to 29-Jul
4	22-Jan to 28-Jan	31	30-Jul to 05-Aug
5	29-Jan to 04-Feb	32	06-Aug to 12-Aug
6	05-Feb to 11-Feb	33	13-Aug to 19-Aug
7	12-Feb to 18-Feb	34	20-Aug to 26-Aug
8	19-Feb to 25-Feb	35	27-Aug to 02-Sep
9	26-Feb to 04-Mar	36	03-Sep to 09-Sep
10	05-Mar to 11-Mar	37	10-Sep to 16-Sep
11	12-Mar to 18-Mar	38	17-Sep to 23-Sep
12	19-Mar to 25-Mar	39	24-Sep to 30-Sep
13	26-Mar to 01-Apr	40	01-Oct to 07-Oct
14	02-Apr to 08-Apr	41	08-Oct to 14-Oct
15	09-Apr to 15-Apr	42	15-Oct to 21-Oct
16	16-Apr to 22-Apr	43	22-Oct to 28-Oct
17	23-Apr to 29-Apr	44	29-Oct to 04-Nov
18	30-Apr to 06-May	45	05-Nov to 11-Nov
19	07-May to 13-May	46	12-Nov to 18-Nov
20	14-May to 20-May	47	19-Nov to 25-Nov
21	21-May to 27-May	48	26-Nov to 02-Dec
22	28-May to 03-Jun	49	03-Dec to 09-Dec
23	04-Jun to 10-Jun	50	10-Dec to 16-Dec
24	11-Jun to 17-Jun	51	17-Dec to 23-Dec
25	18-Jun to 24-Jun	52	24-Dec to 30-Dec
26	25-Jun to 01-Jul	53	31-Dec
27	02-Jul to 08-Jul		

APPENDIX B. ADULT SAMPLING

Appendix B1.—Procedure for sampling adult salmon for age, length, and sex.

Annually, salmon escapements and catches are sampled for age (scales), length, and sex by field crews throughout the state. This database is essential for sound management of the State's salmon resources.

To be useful, data must be recorded on the age, weight, length (AWL) optical scanning (opscan) forms neatly and accurately. In addition, scale samples must be collected and mounted properly to ensure accurate age determination. The following procedures are to be strictly adhered to when sampling adult salmon for age, length, and sex.

PROCEDURES

COMPLETING THE OPSCAN AWL FORMS:

New **green** AWL forms have been developed which have Y2K date capabilities. Before transcribing any information, make sure the correct form is being used. The department no longer uses the outdated red or blue forms.

A completed AWL form and accompanying scale gum card for sampling sockeye salmon are shown in Appendix B2. When collecting two scales per fish, as with coho salmon sampling, follow the procedure illustrated in Appendix B3.

Complete each section on the left side of the AWL form using a No.2 pencil and darken the corresponding circles as shown in the figures. Make every effort to darken the entire circle as the optical scanner, which reads and records the data from the AWL forms, may not recognize partially filled circles. Label only one form at a time to avoid a "carbon paper effect" resulting in stray marks. Special care should be used to ensure that stray marks do not occur on either side of the AWL form. Stray marks and scuffed AWL forms can severely hamper scanning.

Fill out each of the following:

Description

Record the following: species/area/catch or escapement/gear type (if applicable)/samplers.

Card

The AWL forms and corresponding gum card(s) are numbered sequentially by date throughout the season starting with 001. A separate numbering sequence will be used for each species, district, and geographic location. Consult your crew leader for the current card number. Sockeye salmon scale samples will have only one gum card per AWL form as shown in Appendix B2.

Species

Refer to the reverse side of the AWL form for the correct one-digit code (e.g., sockeye = 2).

Day, Month, Year

Escapement sampling: Use appropriate digits for the date the fish are sampled.

Catch sampling: Use the date the fish were caught. If this differs from the sample date, note the sample date in the top margin.

District

List all districts in which the fish were caught. Consult your area statistical map or project leader for the appropriate district. If more than one district is represented, darken the corresponding circles of the district representing most of the catch and note the other catch areas in the top margin (Telrod Cove is in district 254).

Subdistrict (Section)

List all subdistricts in which the fish were caught. If the catch represents more than one section, list each section but do not darken the corresponding circles. Leave blank if the section is unknown. **(Telrod Cove is in subdistrict 50).**

Stream

Leave blank for catch sampling;

Consult area statistical map for the appropriate stream number when collecting escapement samples.

-continued-

Location

List the appropriate code associated with the area the fish were sampled as shown in Appendix B4. For the Spiridon Bay Special Harvest Area this is 046.

Period

Escapement sampling: List the sample week in which the fish were sampled (Appendix A6.).

Catch sampling: List the sample week in which the fish were caught. If this differs from the week the fish were sampled, note this in the top margin.

Project and Gear

Refer to the reverse side of the AWL form for the correct code. For example, escapement samples collected at a weir would have a project code of 3 and a gear code of 19.

Mesh

Leave blank unless specifically instructed by supervisor to do otherwise.

Type of length measurement

Refer to the reverse side of the AWL form for the correct code (e.g., mid eye to tail fork = 2). Refer to Appendix B5.

Number of scales per fish

Fill in the number of scales collected per fish. For sockeye, one scale per fish is collected unless otherwise instructed by supervisor.

of cards

of cards always = 1 (each AWL form has an individual and unique “litho code”).

If possible, keep the AWL form litho codes in numerical order throughout the season and keep all forms flat, dry, and clean. Fish gurry and water curling may cause data to be misinterpreted by the optical scanning machine. **It is the responsibility of the crew leader to make sure that all forms are carefully edited before returning them to their supervisor.**

SCALE GUM CARDS

A completed AWL form and accompanying gum card for sampling sockeye salmon are shown in Appendix B2. When collecting two scales per fish, as with coho salmon sampling, follow the procedure illustrated in Appendix B3. Be sure to fill out the gum cards in pencil as shown in Appendix B2 and B3.

Species

Write out completely (e.g., sockeye).

Locality

Escapement sampling: Include the weir site followed by “escapement” (e.g., Karluk River escapement).

Catch sampling: Include the area(s) where the fish were caught followed by “catch” (e.g., Uganik Bay catch).

Statistical Area Code

Fill in the appropriate digits from the AWL form. If catch samples are from a variety of statistical areas be sure to list each statistical area and approximate percentage from each (if available).

Sampling date

Escapement sampling: Fill in the date the fish were sampled.

Catch sampling: Fill in the date the fish were caught. The sample date, if different from the catch date, may be noted in “remarks”.

-continued-

Gear

Write out completely. If catch samples include multiple gear types, be sure to list each gear and approximate percentage from each (if available).

Collector(s)

Record the last names of each person collecting the sample.

Remarks

Record any pertinent information such as the number of scales per fish sampled, processing facility where the sampling took place, vessel/tender name, etc. Be sure to transfer this information to the top margin of the AWL form.

SAMPLING PROCEDURE

1. Place the fish on its right side to sample the left side.
2. Determine the sex of the fish (escapement sampling only) and darken M or F in the sex columns. If any difficulty is encountered with this procedure, write "I had trouble sexing these fish" on the top margin of the AWL form and ask your supervisor for help as soon as possible before sexing additional fish.
3. Measure fish length in millimeters from mid eye to tail fork (escapement sampling only; Appendix A6). Record length by blackening the appropriate column circles on the AWL form. Column 3 on the AWL form is used for fish with a length greater than 999 millimeters (Chinook). Measure all species of salmon to the nearest mm. When collecting length data, take care to ensure that each length corresponds to the appropriate scale mounted on the gum card, as length-at-age is evaluated for each sample.
4. Remove the "preferred scale" from the fish by grasping the scale's exposed posterior edge with forceps and pulling free (Appendix B6). Remove all slime, grit, and skin from the scale (neoprene wristers work well for this). The preferred scale is located on the left side of the fish, two rows above the lateral line on the diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. If the preferred scale is missing, select a scale within the preferred area on the other side of the fish. If no scales are present in the preferred area on either side of the fish, sample a scale as close to the preferred area as possible and darken the 8 under "age error code" on the AWL form. Do not select a scale located on the lateral line.
5. It is important to take care that scales adhere to the gum card, rough side up. Therefore, without turning the forceps over, clean, moisten, and mount the scale on the gum card with your thumb or forefinger. Exert just enough pressure to spread and smooth the scales directly over the number as shown in Appendix B7. The ridges on the sculptured side can be felt with a fingernail or forceps. Mount the scale with the anterior end oriented toward top of gum card. All scales should be correctly oriented on the card in the same direction (Appendix B7.).
6. Repeat steps 1 through 4 for up to 40 fish on each AWL form.
7. When sampling, use "Rite in the Rain"® books to record the data. Keep the AWL forms in camp where they will be clean, dry, and flat. After sampling is done for the day, transfer the data to the AWL forms. **Each length, sex, and scale must correspond to a single fish! It is the responsibility of the crew leader to be sure the data has been transcribed correctly and the AWL forms filled out completely. Log books containing length and sex data should be returned to Matt Foster at the end of the season.** These are considered raw data and need to be archived. If you choose to record raw data on tape, these tapes must be returned to Matt Foster.

-continued-

SAMPLING CHECKLIST

OPERATIONAL PLAN	PENCILS (NO. 2)
GUM CARDS	FORCEPS
AWL FORMS (GREEN)	PLASTIC CARD HOLDERS
NEOPRENE WRISTERS	CLIPBOARD
MEASURING BOARD	LOG BOOK

SOME REMINDERS

1. For greater efficiency in scale reading, mount scales with anterior end toward top of gum card.
2. AWL forms should be carefully edited. Remember to use the new AWL forms (green) as the red and blue forms are outdated. Re-check header information on AWL forms; make sure all available information is filled in. Take extra care to use the correct period code (sampling week) for the sampling or catch date. AWL form numbers should not be repeated; a frequent error is to begin a week's sample with the last AWL number used the week before. This is particularly important if the data is regularly sent to town; it is easy to forget which AWL form numbers were used. Crew leaders should take time to ensure that the circles are being blackened correctly. If the circles are sloppily marked, the optical scanner records the information incorrectly or misses it entirely.
3. Transfer important comments from the gum cards to the AWL forms. After pressing scales, the cards are seldom referred to again, and important remarks can be lost. Write comments in the top right margin. If there is not room on the AWL form to completely explain the remarks, use a separate piece of paper.
4. Never put data from different dates on one AWL form or one gum card. Even if only one scale is collected that day, begin a new AWL form and gum card the next day.
5. If weights are taken, they may be noted in the right margin of the AWL form during sampling, but be sure to transfer the weights and litho code to the appropriate columns on the reverse of the AWL form before submitting it to your supervisor.
6. Try to keep the litho codes (located in the left margin of the AWL form) in numerical order. This should not be hard to do if they are arranged that way before page numbering. When sampling different areas throughout the season, arrange the litho codes in order before each sample is taken.
7. If AWL forms get wrinkled or splotched the data should be transcribed onto a new AWL form prior to sending in. The optical scanning computer will misread or reject torn or wrinkled sheets. Do not use paperclips on AWL forms.
8. Be careful when collecting and mounting scales in wet conditions (rain, high humidity, etc.). If glue dries on top of the scale, it often obscures scale features, resulting in an unreadable scale. In addition, scales frequently adhere poorly to a wet gum card. Protect the cards and keep them dry to avoid having to remount the scales on a new card. If the cards get wet, try to dry them in a protected area or remount if necessary. Remember, use a pencil when filling out gum cards, because ink will come off during pressing.
9. Visually scan all AWL forms for mistakes. A common error occurs, for instance, in placing both the 4 and 7 of a 475mm fish in the 100s column with nothing in the 10s column.

-continued-

10. Avoid accumulation of incomplete AWL forms. In previous years, there have been cases where individuals have completed several samples before transcribing the information on the AWL forms. This may lead to an increase in errors. After a sample has been completed, try to get the AWL forms filled out as soon as possible. This will ensure more accurate information, as any problems or abnormalities concerning the sample (e.g., many jacks in sample, many fish lacking preferred scale, number of scales do not match number of lengths recorded, etc.) will be fresh in your mind.
 11. Responsibility for accuracy lies first with the primary data collector(s) and finally with the crew leader. Sloppy or incomplete data forms or gum cards will be returned to individual collectors for correction.
-

Appendix B2.—Completed adult salmon AWL form (front side) and associated gum card.

Species: Sockeye Card No: 014

Locality: Frazer Esc.

Stat. Code: 257-40-403-

Sampling Date: Mo. 06 Day 07 Year 2000

Gear: Weir/Trap

Collector(s): D. Roberts, C. Selby

Remarks: _____

DESCRIPTION: Sockeye \ Frazer \ Esc.

Samplers: Roberts, Selby

CARD: 014

SPECIES: Sockeye

DAY: 07

MONTH: 06

YEAR: 2000

DISTRICT: 257

SUBDISTRICT: 40

STREAM: 403

LOCATION: 038

PERIOD: 24

PROJECT: 3

GEAR: 19

MESH: _____

TYPE OF LENGTH MEASUREMENT: 2

NUMBER SCALES/ FISH: 1

OF CARDS: 1

ADF&G ADULT SALMON AGE-LENGTH FORM VERSION 2.1

#	SEX	100's	LENGTH	1's	AGE GROUP	AGE ERROR CODE
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						

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Appendix B3.—Completed adult salmon AWL form (front side) and associated gum card when sampling 2 scales per fish.

Species: Coho Card No: 001A
 Locality: Karluk Esc.
 Stat. Code: 255-10-101-
 Sampling Date: Mo. 08 Day 29 Year 2000
 Gear: Weir/Trap
 Collector(s): Russell, Peterson, McCall
 Remarks: 2 scales / fish

Card 001A

DESCRIPTION: Coho / Karluk / Esc.

CARD:	001	SEX:	100%	LENGTH	1%	AGE GROUP	AGE ERROR CODE
SPECIES:	Coho						
DAY:	29						
MONTH:	08						
YEAR:	2000						
DISTRICT:	255						
SUBDISTRICT:	10						
STREAM:	101						
LOCATION:	035						
PERIOD:	—						
PROJECT:	Esc.						
GEAR:	Weir/Trap						
MESH:	—						
TYPE OF LENGTH MEASUREMENT	2						
NUMBER SCALES/FISH	2						
# OF CARDS:	1						

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Sampled by: Russell, Peterson, McCall

ADF&G ADULT SALMON AGE-LENGTH FORM VERSION 2.1

Species: Coho Card No: 001B
 Locality: Karluk Esc.
 Stat. Code: 255-10-101-
 Sampling Date: Mo. 08 Day 29 Year 2000
 Gear: Weir/Trap
 Collector(s): Russell, Peterson, McCall
 Remarks: 2 scales / Fish

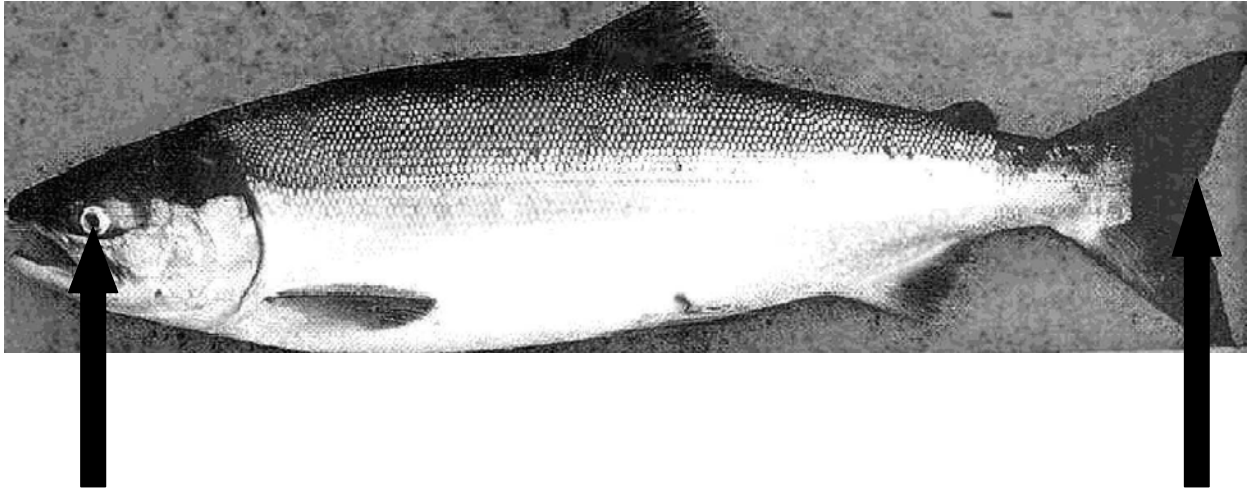
Card 001B

Appendix B4.—Assigned port and weir location codes.

PORT AND LOCATION CODES

029	Uganik	048	Waterfall Bay (WBSHA)
030	Lazy Bay	049	Little River
031	Port of Kodiak	050	King Cove
032	Pauls Lake	051	Port Moller
033	Thorsheim	052	Dutch Harbor
034	Afognak River	053	Akutan
035	Karluk River	054	Sand Point
036	Ayakulik (Red River)	055	Bear River
037	Upper Station	056	Nelson River
038	Frazer Lake	057	Canoe Bay
039	Dog Salmon	058	Ilnik Lagoon
040	Akalura River	059	Orzinski River
041	Uganik River	060	Sandy River
042	Malina Creek	061	Thin Point Lagoon
043	Portage Lake	062	Middle Lagoon
044	Foul Bay (FBSHA)	070	Black Lake
045	Larsen Bay	071	Chignik Weir
046	Spiridon (SBSHA)	072	Chignik (Processing facilities)
047	Little Kitoi		

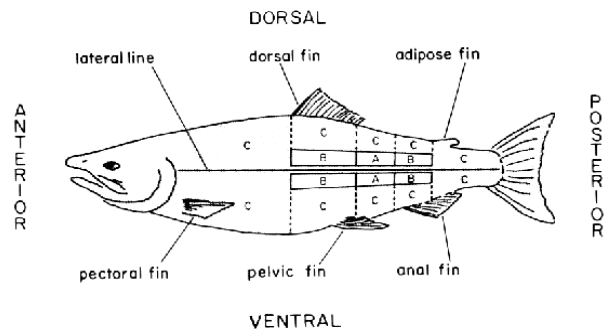
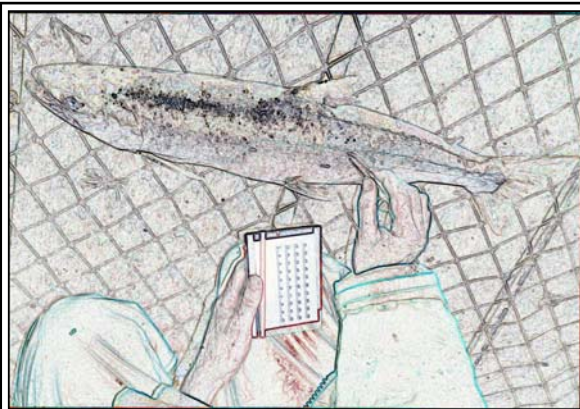
Appendix B5.—Measuring fish length from mid eye to tail fork.



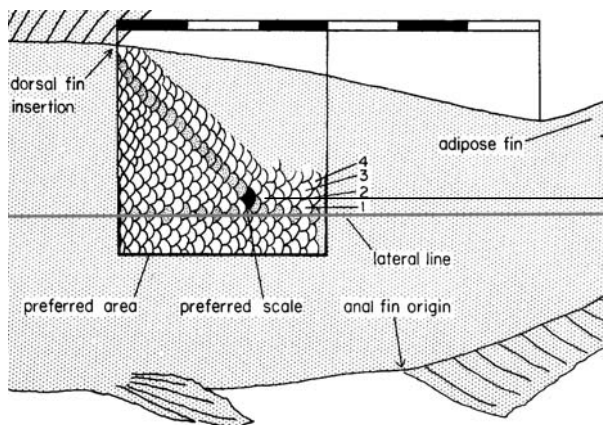
Adult salmon length is measured from mid eye to tail fork because the shape of the salmon's snout changes as it approaches sexual maturity. The procedure for measuring by this method is as follows.

- 1) Place the salmon flat on its right side (on the measuring board) with its head to your left and the dorsal fin away from you.
 - 2) Slide the fish in place so that the middle of the eye is in line with the edge of the meter stick and hold the head in place with your left hand.
 - 3) Flatten and spread the tail against the board with your right hand.
 - 4) Read and record the mid eye to tail fork length to the nearest millimeter.
-

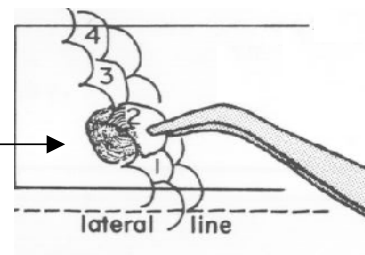
Appendix B6.—Removal and mounting of the preferred salmon scale.



INPFC rated areas for scale removal. Area A is the preferred area. If scales on the left side are missing, try the right side. Area B is the second choice if there are no scales in area A on either side of the fish. Area C designates non preferred areas.

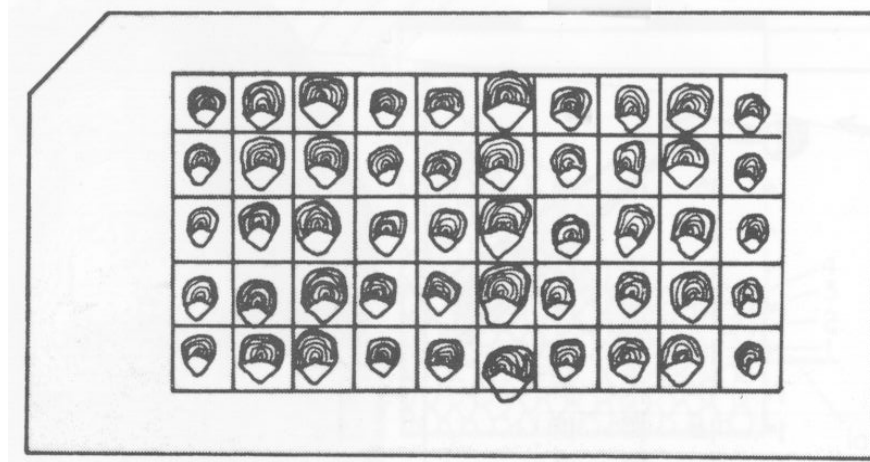


Do not turn scale over.

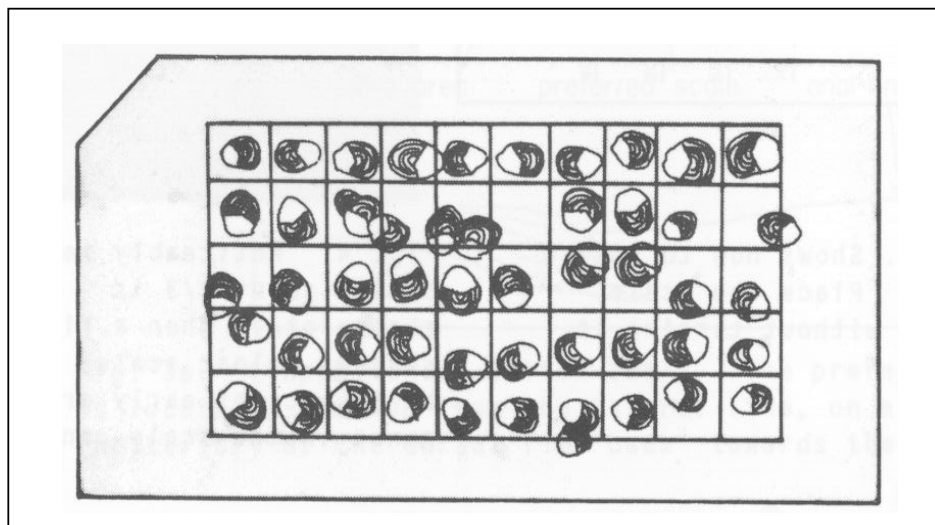


The preferred scale in this diagram is solid black. It is located 2 rows up from the lateral line, on a diagonal from the insertion (posterior) of the dorsal fin “back” toward the origin of the anal fin.

Appendix B7.—Scale orientation on the salmon scale gum card.



The scales are all correctly oriented on the card in the same direction, with the anterior portion of the scale pointed toward the top of the card and the posterior portion (which is that portion of the scale held in the forceps) pointed toward the bottom of the card.



The scales are incorrectly oriented in different directions. This increases the time spent to age samples.

APPENDIX C. SATELLITE TELEPHONE AND DISPATCH INSTRUCTIONS

Appendix C1.—Satellite telephone and dispatch instructions.

The following information serves as a Policy Statement regarding the allowable uses of ADF&G satellite phones and Instructions on the proper method to successfully set up and operate the satellite phone system assigned to your camp.

These systems are not like standard telephones or cell phones, nor are they like a single side band or VHF radio. Communication is sent through the transmitter to low level satellites, then is beamed down to ground stations, either directly to another satellite phone system or to a switching station linked to standard telephone lines. As such, there is a much higher cost involved in operation than with standard telephone long distance or cell phone charges.

Under NO CIRCUMSTANCES may you use this satellite phone system for personal calls, unless, for each event, you have obtained direct and explicit permission from your supervisor. Under no circumstances may you use this satellite phone system for personal calls, unless a family or personal emergency exists. This does not mean that field crew leaders may grant permission for personal use of this phone. Only the project biologist may give you such permission. ANY DELIBERATE MISUSE OF THIS SYSTEM, SUCH AS MAKING UNAPPROVED, NON-EMERGENCY, OR PERSONAL CALLS, WILL RESULT IN DISCIPLINARY ACTION, WHICH MAY INCLUDE SUSPENSION OR DISCHARGE.

The primary purpose for having this satellite phone is for secure, reliable communications between remote field stations and ADF&G offices (Kodiak, Chignik, Cold Bay, Sand Point, or Port Moller), ADF&G research vessels (Resolution or K-Hi-C), Fish and Wildlife Protection vessels and offices, or other field camps that are similarly equipped. The secondary purpose is for your SAFETY. With these phones you are capable of directly dialing emergency services at any time of the day or night. It is essential that these phone systems are maintained in good working order, are fully charged or hooked to sufficient power at all times, and remain free for official or emergency use.

INSTRUCTIONS

The portable sat phone unit must be charged with power. There is an internal battery pack, and a 12-volt adapter is available in order to hook the phone to a larger battery bank, that may in turn be recharged by generator or solar panels.

Turn the unit on using the power switch in the lower left corner. A green light, just above the switch, should come on indicating that the unit is sufficiently powered. If no light or a red light comes on, you will need to charge the unit, or attach it to your 12-volt battery bank via the appropriate connections.

The back, or top, of the briefcase-like unit is the antenna, and it must be oriented correctly in order to access the receiving satellite. The top of the case should be open and pointed in a general east-southeast direction. You must have a fairly clear line-of sight to the horizon in that direction; this unit will NOT work through walls or mountains. The angle of the antenna should be almost vertical; remember to lock the support arm that attaches the lid to the main body of the unit, along the right side.

This system has two means for calling; a telephone-like handset (for dial in or dial out phone calls), and a push-to-talk microphone (for 'dispatch', unit to unit, calls). All calls made with the handset are billed per minute of use, at an expensive rate. All calls on the 'AlaskaNet' dispatch system, using the microphone, are essentially FREE.

When first turned on, the handset and microphone should become active, with the display panels on the top of the phone handset and microphone lighting up (one LED panel, hopefully the one on the handset, should read SLEEP). The display will show, after a few moments, whether a connection has been established with the satellite, and how strong the signal is (ex. B05 S 21). Turn the unit slightly, and raise or lower the lid/antenna slightly until the highest possible signal strength is indicated (normally above 20 but will work down to 8). Lock the lid/antenna in place and do not turn the unit again, until your communications are finished. Once a strong signal is acquired push the "*" button for 2 seconds. Wait until there is a "beep" and the LCD screen displays '00:DN ??', then dial the number.

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Alaska Dispatch System

Because all calls made on the dispatch system are FREE, this is the method of choice for using the satellite phone units. There are several ADF&G offices, many field camps, and two research vessels on the AlaskaNet dispatch system, as well as Fish and Wildlife Protection/State Troopers offices and vessels, plus many canneries, fishing vessels, and tenders. You should have received a 10-12 page directory with your phone.

First, make sure the unit is turned on, and that there is sufficient power. Set the unit up so that the signal strength is at the maximum for your location. You should see the signal strength on the microphone display (ex. *B05 S 21*), and the handset display should read SLEEP. Once a strong signal is acquired push the “*” button for 2 seconds. Wait until there is a “beep”.

On the microphone display, below the signal strength, there should be a query, ‘00:DN ??’. This is asking you to ‘dial’ in the 4-digit dispatch number that you wish to call. After you have entered the 4-digit dispatch number of the unit you wish to contact, hold in the microphone key and a connection will be made with the satellite, which will then try to connect with the dispatch number you punched in. IF a connection is made you will hear two beeps (“bird chirps”) and the microphone display will read SELF. While continuing to hold in the microphone key, call the station you wish to talk to. USE ALL

THE SAME FORMALITIES AS WHEN CALLING ON A SSB RADIO. For example, say “Calling the ADF&G Kodiak Office, Calling the ADF&G Kodiak Office; this is Karluk Weir”. When you release the microphone key, the unit will beep again.

BE PATIENT. It will take some time for the signal to go up to the satellite, down to the number you called. It may take the other party some time to get to the microphone and respond (this is especially true for calls to the ADF&G office; supervisors have to walk down to the radio room to respond). When they respond, their 4-digit dispatch number (DN) will show on the microphone display. This is a private conversation, unlike the previous dispatch service.

Just remember to be patient; wait until the other party stops speaking and you hear the unit beep (indicating that they are finished with this portion of their communication), the display should read SELF, and you may key microphone to talk. Then you must again wait for the other party to respond. If the other party is not there, they simply will not answer. If the satellite connection cannot be made, the display will read ‘Unable to Connect’ or ‘Not Available’.

Phone System

DO NOT USE THE HANDSET TO PLACE CALLS UNLESS ABSOLUTELY NECESSARY. All calls made with the handset are billed per minute of use, at an expensive rate. Calls should only be made to supervisors, either when radio or dispatch contact is not possible or when a confidential message needs to be relayed. Calls are made by dialing out, almost like a standard telephone. Punch in the area code and telephone number, then PRESS SEND (button located in the upper right corner of the handset). Because there is a satellite relay, there will be a slight delay between when you speak and when the other party hears you, so be patient.

Note EVERY call in a phone logbook. The system will show you the amount of time you’ve used on the call, on the LED panel. Note the number called, the date, approximate time, and the length of the call (minutes and seconds). When the call is completed, you MUST push the END button (top right corner of handset buttons), otherwise the system will remain active and YOU will be billed for the time (at almost a dollar a minute). Remember, PRESS END.

If someone calls in to this unit, it will ring, like a standard telephone. Press the SEND button to start the conversation, but remember to PRESS END to finish the call. ADF&G is billed for all calls made using the handset, both the calls you dial out and any calls dialed in.

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IN CASE OF EMERGENCY:

If there is a medical emergency, or a real danger to life or health, IMMEDIATELY call the US Coast Guard Rescue Coordination Center at 800-478-5555. Be ready to tell them your name, exact location (latitude and longitude or nearby major landmark), and the exact nature of your emergency. They may question you extensively, so be prepared. There are emergency doctors on-call that can advise you. After the call is completed, immediately call your supervisor, at work or at home, and relay the details of your experience.

If there is an enforcement emergency, use the dispatch microphone to call the Kodiak office or the Alaska State Trooper, Fish and Wildlife Protection (DN 6370).

APPENDIX D. TIMESHEET INSTRUCTIONS

Appendix D1.—Instructions for filling out a timesheet.

All ADF&G employees must fill out a time sheet biweekly and these timesheets must be turned in to the Administrative staff in Kodiak in a timely manner. Please follow these instructions when filling out your time sheets to avoid payroll problems. When a flight comes out to drop off groceries, or for any other reason, near the end of a pay period, camp personnel need to send in their timesheets. Fill in the time sheet up to the day you send them in and attempt to project your remaining hours worked.

Fill out each of the following on the top of the timesheet:

Pay period: pay periods start on the 1st or 16th of each month and end on the 15th or end of the month (example: June 1-15 or June 16-30).

SSN: your social security number

Name: full name

Division: Commercial Fish

In the actual timesheet table fill in the following:

Day: Monday, Tuesday, etc.

Date: 6/16, 6/17, etc.

Hours worked box: start and stop time in military time

Code 1: fill in the number of hours worked for that day (see example in Appendix D.2.).

Work hours and Code 1 Totals should both equal the sum of daily hours worked. If your time sheet is sent in before the end of the pay period, project your time for the remaining days so you can total your columns.

Charge to Table located on the bottom left hand side of the time sheet should be left blank unless otherwise instructed by your project supervisor.

Comments Table located on the bottom right hand side of the time sheet should be left blank unless otherwise instructed by your project supervisor.

Employee's signature and date: Be sure to sign and date your timesheet.

Crew leaders are responsible for reviewing each crew member's timesheet before sending them to town to ensure that they are properly filled out.

APPENDIX E. EXAMPLE OF A WEEKLY REPORT

Appendix E1.—Example of a weekly report.

To: Greg Watchers **Date:** 5/30/04

ADF&G, Fisheries Biologist

Kodiak, Alaska

From: Amy Brodersen

ADF&G, Fish and Wildlife Technician

Subject: Weekly Report Spiridon Lake Smolt Project

Smolt Outmigration

As of 5/29/04, a total count of 1,092,959 live and 4,372 dead smolt have passed through the waterfall bypass system, averaging over 100,000 smolt/night for the past six nights.

Cumulative mortality is 0.4%.

Some smolt are holding in the de-watering tanks.

The water temperature has increased from 6.0 to 7.0 degrees. Water level has increased 24 to 26 cm.

A.W.L sampling

A total of 949 A.W.L. samples have been collected. On 5/29/04, 70 smolt were sampled. The average weight was 10.0 grams and the average length was 108 mm.

Safety

The crew checked the trauma kit inventorying supplies and checked expiration dates on medicines.

Anticipated Activities

Continue counting smolt
